Vignette ecospat package

Contents

==========

Valeria Di Cola, Olivier Broennimann, Blaise Petitpierre, Manuela D'Amen, Frank Breiner & Antoine Guisan ##### September 26, 2016

Miscellaneous methods and utilities for spatial ecology analysis, written by current and former members and collaborators of the ecospat group of Antoine Guisan, Department of Ecology and Evolution (DEE) & Institute of Earth Surface Dynamics (IDYST), University of Lausanne, Switzerland.

ecospat offers the possibility to perform Pre-modelling Analysis, such as Spatial autocorrelation analysis, MESS (Multivariate Environmental Similarity Surfaces) analyses, Phylogenetic diversity Measures, Biotic Interactions. It also provides functions to complement *biomod2* in preparing the data, calibrating and evaluating (e.g. boyce index) and projecting the models. Complementary analysis based on model predictions (e.g. co-occurrences analyses) are also provided.

In addition, the *ecospat* package includes Niche Quantification and Overlap functions that were used in Broennimann et al. 2012 and Petitpierre et al. 2012 to quantify climatic niche shifts between the native and invaded ranges of invasive species.

1 Load data

```
library(ecospat)
```

```
## Loading required package: ade4
## Loading required package: ape
## Loading required package: gbm
## Loading required package: survival
## Loading required package: lattice
## Loading required package: splines
## Loading required package: parallel
```

```
## Loaded gbm 2.1.1

## Loading required package: sp
```

```
citation("ecospat")
```

```
##
## To cite package 'ecospat' in publications use:
##
##   Olivier Broennimann, Valeria Di Cola and Antoine Guisan (2016).
##   ecospat: Spatial Ecology Miscellaneous Methods. R package
##   version 2.1.1.
##   http://www.unil.ch/ecospat/home/menuguid/ecospat-resources/tools.html
##
## A BibTeX entry for LaTeX users is
##
##   @Manual{,
##     title = {ecospat: Spatial Ecology Miscellaneous Methods},
##     author = {Olivier Broennimann and Valeria {Di Cola} and Antoine Guisan},
##     year = {2016},
##     note = {R package version 2.1.1},
##     url = {http://www.unil.ch/ecospat/home/menuguid/ecospat-resources/tools.html},
##   }
```

1.0.1 Test data for the ecospat library

ecospat.testData()

```
data(ecospat.testData)
names(ecospat.testData)
```

```
##  [1] "numplots"                    "long"
##  [3] "lat"                         "ddeg"
##  [5] "mind"                        "srad"
##  [7] "slp"                         "topo"
##  [9] "Achillea_atrata"             "Achillea_millefolium"
## [11] "Acinos_alpinus"              "Adenostyles_glabra"
## [13] "Aposeris_foetida"            "Arnica_montana"
## [15] "Aster_bellidiastrum"         "Bartsia_alpina"
## [17] "Bellis_perennis"             "Campanula_rotundifolia"
## [19] "Centaurea_montana"           "Cerastium_latifolium"
## [21] "Cruciata_laevipes"           "Doronicum_grandiflorum"
## [23] "Galium_album"                "Galium_anisophyllon"
## [25] "Galium_megalospermum"        "Gentiana_bavarica"
## [27] "Gentiana_lutea"              "Gentiana_purpurea"
## [29] "Gentiana_verna"              "Globularia_cordifolia"
## [31] "Globularia_nudicaulis"       "Gypsophila_repens"
## [33] "Hieracium_lactucella"        "Homogyne_alpina"
## [35] "Hypochaeris_radicata"        "Leontodon_autumnalis"
## [37] "Leontodon_helveticus"        "Myosotis_alpestris"
## [39] "Myosotis_arvensis"           "Phyteuma_orbiculare"
## [41] "Phyteuma_spicatum"           "Plantago_alpina"
## [43] "Plantago_lanceolata"         "Polygonum_bistorta"
## [45] "Polygonum_viviparum"         "Prunella_grandiflora"
## [47] "Rhinanthus_alectorolophus"   "Rumex_acetosa"
## [49] "Rumex_crispus"               "Vaccinium_gaultherioides"
## [51] "Veronica_alpina"             "Veronica_aphylla"
## [53] "Agrostis_capillaris"         "Bromus_erectus_sstr"
## [55] "Campanula_scheuchzeri"       "Carex_sempervirens"
```

```
## [57] "Cynosurus_cristatus"           "Dactylis_glomerata"
## [59] "Daucus_carota"                 "Festuca_pratensis_sl"
## [61] "Geranium_sylvaticum"           "Leontodon_hispidus_sl"
## [63] "Potentilla_erecta"             "Pritzelago_alpina_sstr"
## [65] "Prunella_vulgaris"             "Ranunculus_acris_sl"
## [67] "Saxifraga_oppositifolia"       "Soldanella_alpina"
## [69] "Taraxacum_officinale_aggr"     "Trifolium_repens_sstr"
## [71] "Veronica_chamaedrys"           "Parnassia_palustris"
## [73] "glm_Agrostis_capillaris"       "glm_Leontodon_hispidus_sl"
## [75] "glm_Dactylis_glomerata"        "glm_Trifolium_repens_sstr"
## [77] "glm_Geranium_sylvaticum"       "glm_Ranunculus_acris_sl"
## [79] "glm_Prunella_vulgaris"         "glm_Veronica_chamaedrys"
## [81] "glm_Taraxacum_officinale_aggr" "glm_Plantago_lanceolata"
## [83] "glm_Potentilla_erecta"         "glm_Carex_sempervirens"
## [85] "glm_Soldanella_alpina"         "glm_Cynosurus_cristatus"
## [87] "glm_Campanula_scheuchzeri"     "glm_Festuca_pratensis_sl"
## [89] "glm_Bromus_erectus_sstr"       "glm_Saxifraga_oppositifolia"
## [91] "glm_Daucus_carota"             "glm_Pritzelago_alpina_sstr"
## [93] "gbm_Bromus_erectus_sstr"       "gbm_Saxifraga_oppositifolia"
## [95] "gbm_Daucus_carota"             "gbm_Pritzelago_alpina_sstr"
```

1.0.2 Test data for the Niche Overlap Analysis

ecospat.testNiche.inv()

```
data(ecospat.testNiche.inv)
names(ecospat.testNiche.inv)
```

```
##  [1] "x"           "y"           "aetpet"      "gdd"         "p"
##  [6] "pet"         "stdp"        "tmax"        "tmin"        "tmp"
## [11] "species_occ" "predictions"
```

ecospat.testNiche.nat()

```
data(ecospat.testNiche.nat)
names(ecospat.testNiche.nat)
```

```
##  [1] "x"           "y"           "aetpet"      "gdd"         "p"
##  [6] "pet"         "stdp"        "tmax"        "tmin"        "tmp"
## [11] "species_occ" "predictions"
```

1.0.3 Test tree for Phylogenetic Diversity Analysis

ecospat.testTree()

```
fpath <- system.file("extdata", "ecospat.testTree.tre", package="ecospat")
fpath
```

```
## [1] "/private/var/folders/tq/p13f4x0n75d94lvlkzzr4ylr0000gs/T/RtmpLZlNPA/Rinstdff1759c1d/ecospat/
```

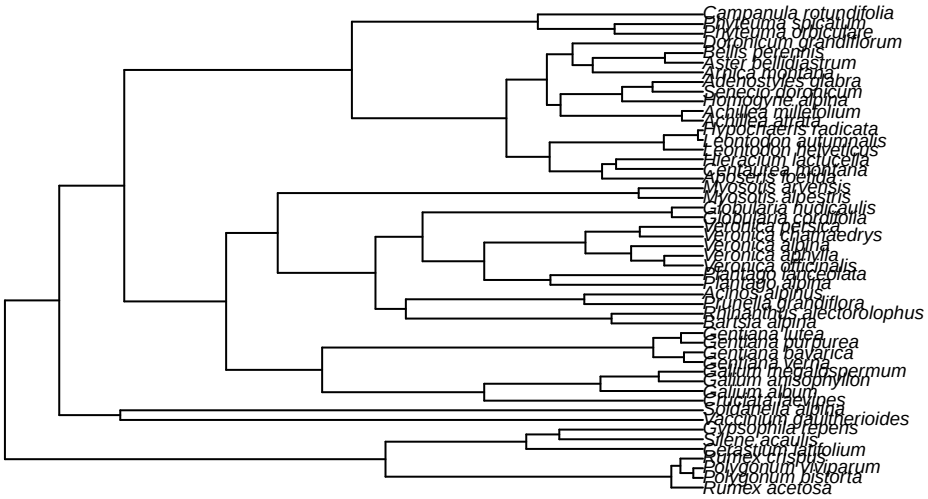
```
tree<-read.tree(fpath)
tree$tip.label
```

```
##  [1] "Rumex_acetosa"             "Polygonum_bistorta"
##  [3] "Polygonum_viviparum"       "Rumex_crispus"
##  [5] "Cerastium_latifolium"      "Silene_acaulis"
##  [7] "Gypsophila_repens"         "Vaccinium_gaultherioides"
##  [9] "Soldanella_alpina"         "Cruciata_laevipes"
## [11] "Galium_album"              "Galium_anisophyllon"
## [13] "Galium_megalospermum"      "Gentiana_verna"
```

```
## [15] "Gentiana_bavarica"          "Gentiana_purpurea"
## [17] "Gentiana_lutea"             "Bartsia_alpina"
## [19] "Rhinanthus_alectorolophus" "Prunella_grandiflora"
## [21] "Acinos_alpinus"             "Plantago_alpina"
## [23] "Plantago_lanceolata"        "Veronica_officinalis"
## [25] "Veronica_aphylla"           "Veronica_alpina"
## [27] "Veronica_chamaedrys"        "Veronica_persica"
## [29] "Globularia_cordifolia"      "Globularia_nudicaulis"
## [31] "Myosotis_alpestris"         "Myosotis_arvensis"
## [33] "Aposeris_foetida"           "Centaurea_montana"
## [35] "Hieracium_lactucella"       "Leontodon_helveticus"
## [37] "Leontodon_autumnalis"       "Hypochaeris_radicata"
## [39] "Achillea_atrata"            "Achillea_millefolium"
## [41] "Homogyne_alpina"            "Senecio_doronicum"
## [43] "Adenostyles_glabra"         "Arnica_montana"
## [45] "Aster_bellidiastrum"        "Bellis_perennis"
## [47] "Doronicum_grandiflorum"     "Phyteuma_orbiculare"
## [49] "Phyteuma_spicatum"          "Campanula_rotundifolia"
```

Plot tree

```
plot(tree, cex=0.6)
```

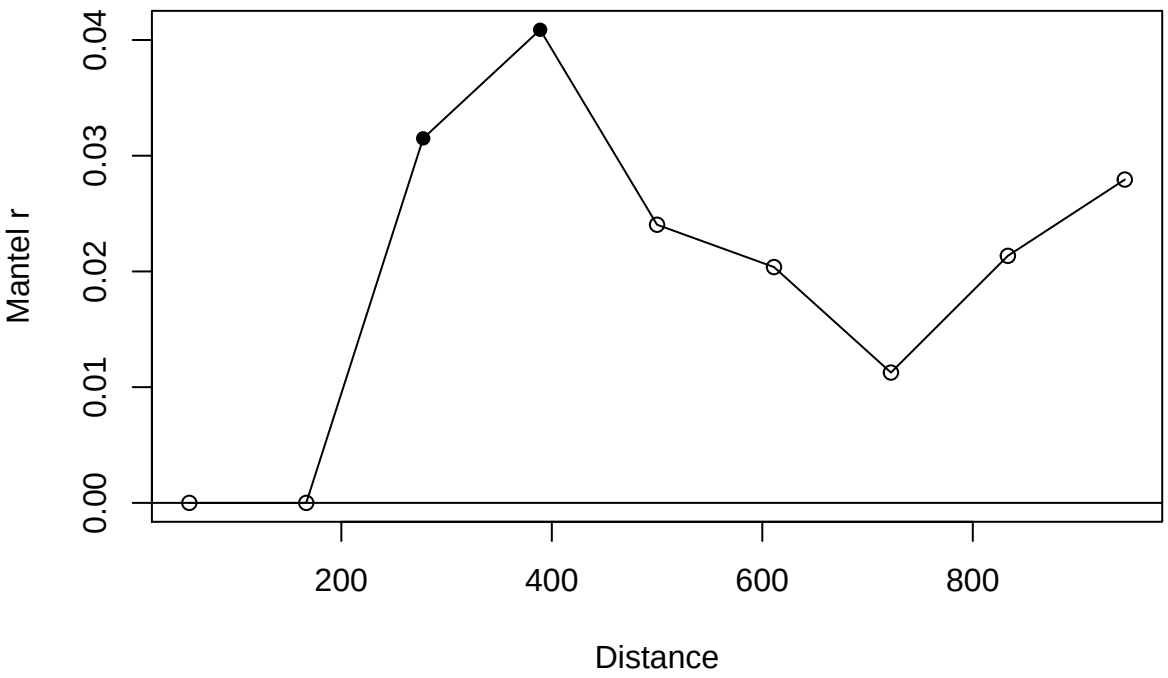


2 Pre-Modelling Analysis

2.1 Spatial Auto-correlation

2.1.1 Mantel Correlogram with *ecospat.mantel.correlogram()*

```
ecospat.mantel.correlogram(dfvar=ecospat.testData[c(2:16)],colxy=1:2, n=100,
                           colvar=3:7, max=1000, nclass=10, nperm=100)
```



The graph indicates that spatial autocorrelation (SA) is minimal at a distance of 180 meters. Note however that SA is not significantly different than zero for several distances (open circles).

2.2 Predictor Variable Selection

2.2.1 Number of Predictors with Pearson Correlation *ecospat.npred()*

```
colvar <- ecospat.testData[c(4:8)]
x <- cor(colvar, method="pearson")
ecospat.npred (x, th=0.75)
```

```
## [1] 4
```

2.2.2 Number of Predictors with Spearman Correlation *ecospat.npred()*

```
x <- cor(colvar, method="spearman")
ecospat.npred (x, th=0.75)
```

```
## [1] 4
```

2.3 Extrapolation Detection Tools

2.3.1 Extrapolation Detection with *ecospat.exdet()*

```
x <- ecospat.testData[c(4:8)]
p<- x[1:90,] #A projection dataset.
ref<- x[91:300,] # A reference dataset
```

```
ecospat.exdet(ref,p)
```

```
##  [1]  0.185415746 -0.028290993 -0.032909931 -0.009237875 -0.034642032
##  [6] -0.209006928 -0.084295612 -0.103622863  0.355220600 -0.136258661
## [11] -0.087182448 -0.209006928 -0.143187067 -0.124711316 -0.114844720
## [16] -0.230596451  0.276046242  0.249093277 -0.125288684 -0.101226337
```

```
## [21] -0.113883908 -0.204653076 -0.001154734 -0.132217090 -0.100461894
## [26]  0.464738681 -0.416578541 -0.044457275 -0.018475751 -0.122225532
## [31] -0.137611720 -0.050808314  0.254605027 -0.062012319  0.238294633
## [36] -0.159141330 -0.147806005  0.277670365 -0.071593533 -0.019053118
## [41]  0.390781314  0.175132571  0.401892929  0.843703731  0.286155800
## [46]  0.321142114  0.668511130  0.252253209  0.440050672  0.177247206
## [51]  0.831525456  0.303710525  0.197182304  0.219273698  0.196637663
## [56]  0.195300816  0.142395786  0.176988160 -0.051991905  0.265163111
## [61] -0.020785219 -0.017898383  0.553965995  0.409635110  0.323633285
## [66]  0.468693064  0.124983005 -0.032909931  0.165642783  0.147046687
## [71]  0.202895471  0.341992334  0.225508458  0.133254065  0.485295264
## [76] -0.047344111 -0.012282931  0.165429659  0.134199992  0.216655251
## [81]  0.139419127  0.121254775  0.098782992  0.591393741  0.110866239
## [86]  0.146010655  0.095562156  0.093353356  0.081712342  0.160531262
```

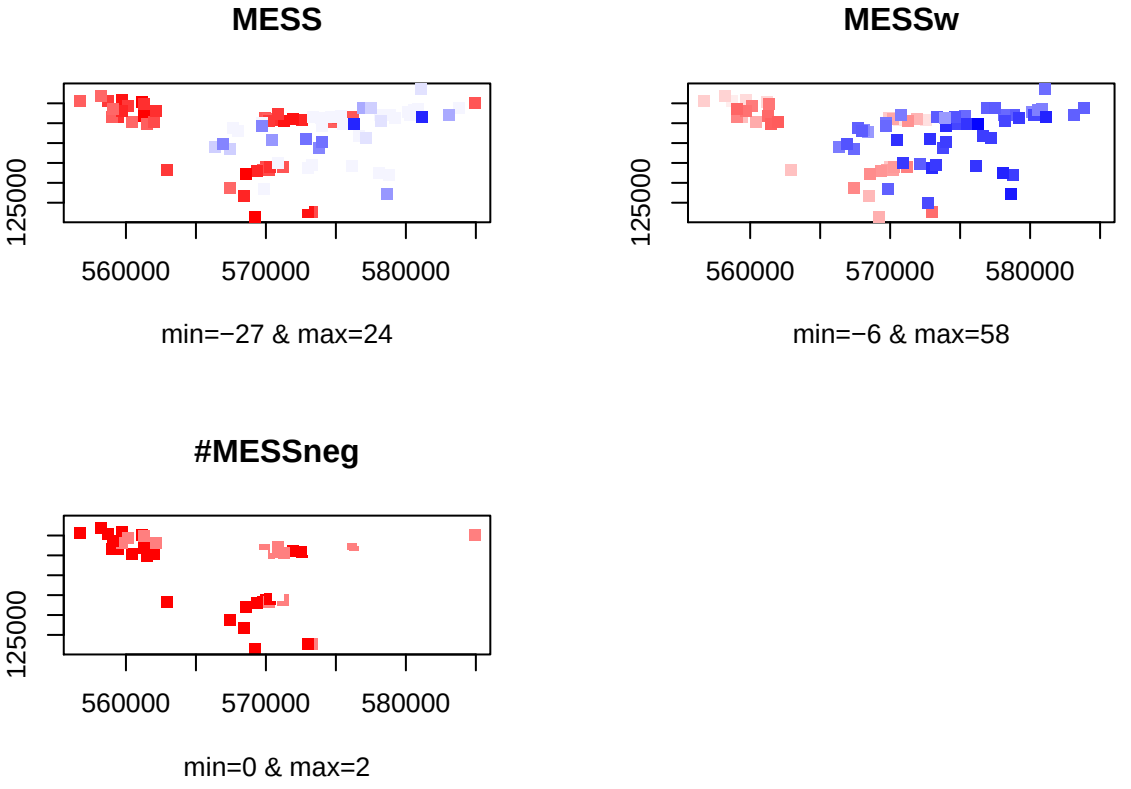
2.3.2 Extrapolation detection, creating a MESS object with *ecospat.mess()*

```
x <- ecospat.testData[c(2,3,4:8)]
proj<- x[1:90,] #A projection dataset.
cal<- x[91:300,] #A calibration dataset
```

```
mess.object<-ecospat.mess (proj, cal, w="default")
```

2.3.2.1 Plot MESS with *ecospat.plot.mess()*

```
ecospat.plot.mess (xy=proj[c(1:2)], mess.object, cex=1, pch=15)
```



In the MESS plot pixels in red indicate sites where at least one environmental predictor has values outside of the range of that predictor in the calibration dataset. In the MESSw plot, same as previous plot but with weighted by the number of predictors.Finally, the MESSneg plot shows at each site how many predictors have values outside of their calibration range.

2.4 Phylogenetic Diversity Measures

```
fpath <- system.file("extdata", "ecospat.testTree.tre", package="ecospat")
tree <- read.tree(fpath)
data <- ecospat.testData[9:52]
```

2.4.1 Calculate Phylogenetic Diversity Measures *ecospat.calculate.pd*

```
pd<- ecospat.calculate.pd(tree, data, method = "spanning", type = "species", root = TRUE, average =
```

```
## Progress (. = 100 pixels calculated):
## ... [300]
## All 300 pixels done.
```

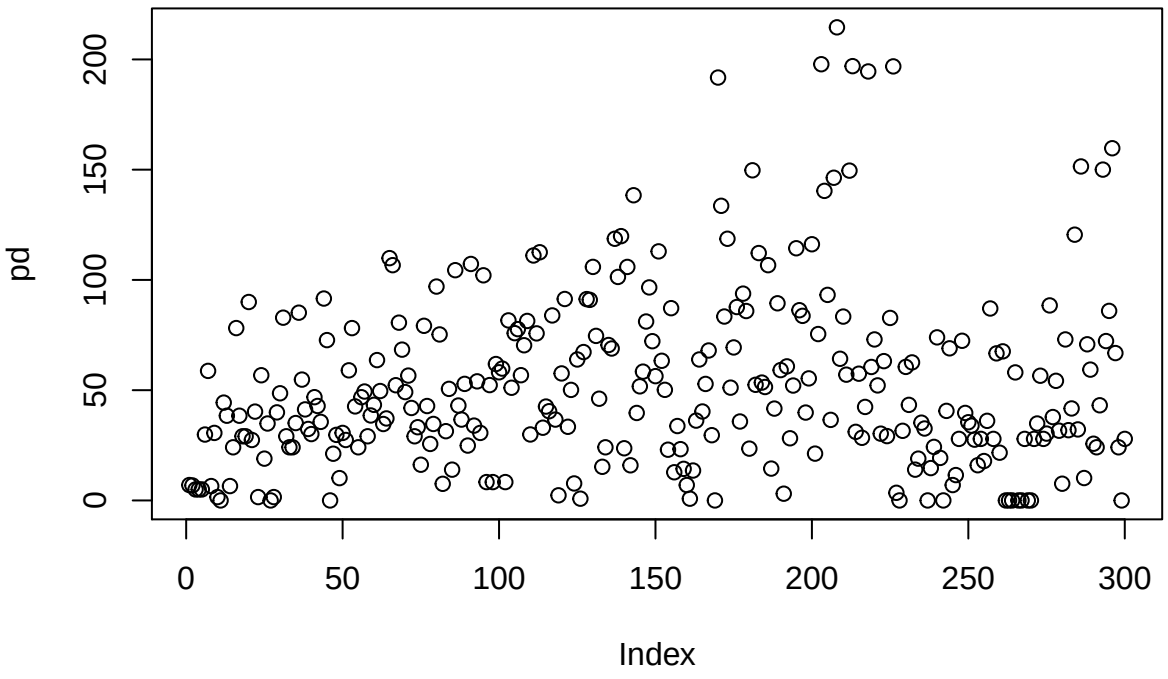
```
pd
```

```
##   [1]   6.9782188   6.7981743   4.9964700   4.9964700   4.9964700
##   [6]  29.8820547  58.7451752   6.5223035  30.6152478   1.5258335
##  [11]   0.0000000  44.3661803  38.4155607   6.5223035  24.0929443
##  [16]  78.1607950  38.4155607  29.0894143  29.0894143  89.9839758
##  [21]  27.4135569  40.2827035   1.5258335  56.7686202  18.9535475
##  [26]  34.8871800   0.0000000   1.5258335  39.9291325  48.5997861
##  [31]  82.8763723  29.0894143  24.0929443  24.0929443  35.0949481
##  [36]  85.1406422  54.7974724  41.2817284  32.4100269  30.0984781
##  [41]  46.8247511  42.8358475  35.6223697  91.5539224  72.7022527
##  [46]   0.0000000  21.1862293  29.7320308  10.1187868  30.6152478
##  [51]  27.4135569  59.0015345  78.1536692  42.6423378  24.0929443
##  [56]  46.8050070  49.3924266  29.0894143  38.5290848  43.3611373
##  [61]  63.6397674  49.6097169  34.6522309  37.1871282 109.8813371
##  [66] 106.6971561  52.2512132  80.6221671  68.3867818  49.1362998
##  [71]  56.6138690  41.9283257  29.0894143  33.2026673  16.1897593
##  [76]  79.1938213  42.8115427  25.6187778  34.6805724  96.9902366
##  [81]  75.2672695   7.5313673  31.4078882  50.5865673  13.9570775
##  [86] 104.4121025  43.0464918  36.6693230  52.8590823  24.8855847
##  [91] 107.2302322  33.9358604  54.0048319  30.6152478 102.0983385
##  [96]   8.3170826  52.3071062   8.3170826  61.8562896  58.1179346
## [101]  59.7939424   8.3170826  81.6495398  51.1054635  75.8701970
## [106]  77.6947419  56.7929250  70.3693202  81.3965205  29.9118877
## [111] 111.0790432  75.7518798 112.5482496  32.9763735  42.5644761
## [116]  40.4507005  83.8955419  36.6693230   2.3184739  57.5978451
## [121]  91.3453370  33.3983912  50.1351419   7.7084002  63.9227817
## [126]   0.7926404  67.2813325  91.2965996  90.9578739 105.9024741
## [131]  74.6128871  46.1321553  15.2479619  24.0929443  70.4802708
## [136]  68.8949899 118.6657550 101.3545260 119.8539056  23.6602184
## [141] 105.8968281  15.9336325 138.4059855  39.6674173  51.7391372
## [146]  58.4119283  81.1388699  96.6048825  72.2156025  56.3601992
## [151] 112.9489963  63.3258805  50.1594468  23.0021994  87.1886965
## [156]  12.7714946  33.7421666  23.2537702  14.3226164   6.9752071
## [161]   0.7926404  13.5641350  36.2007616  63.9227817  40.3310946
## [166]  52.8264129  67.9956878  29.5843437   0.0000000 191.7818606
## [171] 133.6077875  83.3977825 118.6711630  51.1512871  69.3838811
## [176]  87.7066616  35.8005270  93.7797077  85.8984840  23.4933413
## [181] 149.7094684  52.4451847 112.1873673  53.4479612  51.4341108
## [186] 106.6959500  14.4361405  41.6547546  89.4018733  59.1068292
## [191]   3.0516670  60.7852739  28.1850877  52.1002690 114.3651475
## [196]  86.2640717  83.7092232  39.8499777  55.3514065 116.1795597
## [201]  21.2346203  75.4593878 197.8157358 140.3806968  93.2192350
```

```
## [206]  36.5337815 146.3370747 214.5450205  64.2439145  83.3740177
## [211]  57.0440643 149.5697614 196.9415036  31.0984631  57.4769230
## [216]  28.4014469  42.3978747 194.5384819  60.5204195  73.0060715
## [221]  52.1628582  30.2801165  63.1752097  29.1789484  82.7662787
## [226] 196.8309769   3.4666557   0.0000000  31.5688084  60.5650008
## [231]  43.3334929  62.5952411  13.9570775  18.9495667  35.2646601
## [236]  32.6155790   0.0000000  14.6693623  24.2745827  73.9480832
## [241]  19.2825866   0.0000000  40.6115985  68.9862341   6.9782188
## [246]  11.5030881  27.9105497  72.4020225  39.6781995  35.4596364
## [251]  33.9160835  27.5735165  15.9619740  27.9105497  17.8628493
## [256]  36.0936777  87.0440848  27.9105497  66.6907987  21.6475811
## [261]  67.5969904   0.0000000   0.0000000   0.0000000  58.0542370
## [266]   0.0000000   0.0000000  27.9105497   0.0000000   0.0000000
## [271]  27.9105497  34.8887684  56.5556633  27.9105497  30.3097595
## [276]  88.4296666  37.8150727  54.2397810  31.6243116   7.5799087
## [281]  73.0136833  31.8638035  41.7172212 120.5228857  32.2001243
## [286] 151.4545228  10.1544492  70.8133537  59.3255687  25.7211220
## [291]  24.1115267  43.1500941 150.0299191  72.2758570  85.9498096
## [296] 159.7242106  66.8328159  24.0929443   0.0000000  27.9105497
```

2.4.1.1 Plot the results (correlation of phylogenetic diversity with species richness)

```
plot(pd)
```



2.5 Niche Quantification and Comparison with Ordination techniques

Loading test data for the niche dynamics analysis in the invaded range

```
inv <- ecospat.testNiche.inv
```

Loading test data for the niche dynamics analysis in the native range

```
nat <- ecospat.testNiche.nat
```

2.5.1 PCA-ENVIRONMENT

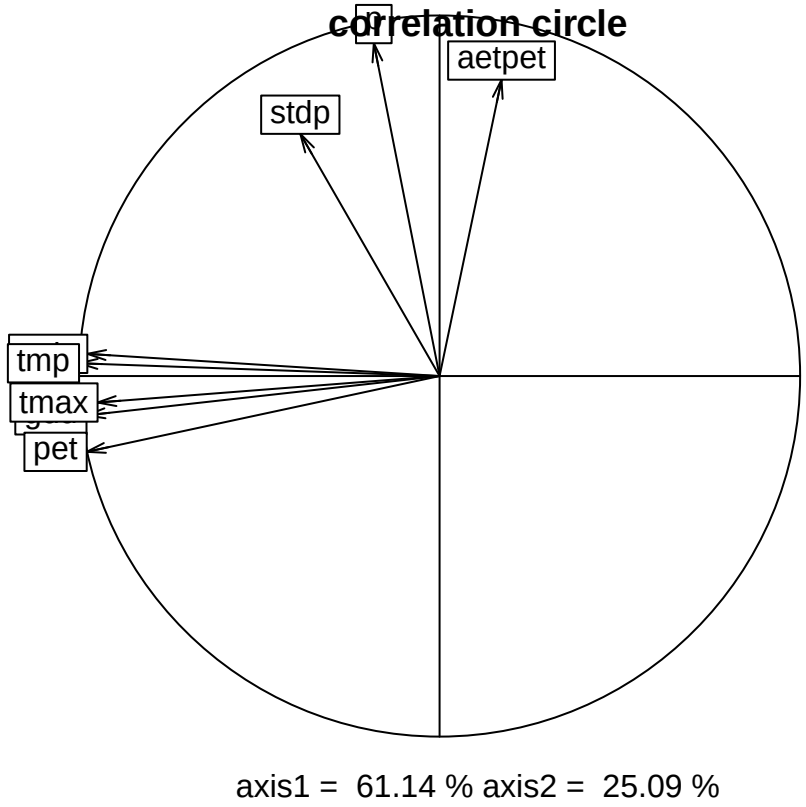
2.5.1.1 The PCA is calibrated on all the sites of the study area

Calibrating the PCA in the whole studay area, including both native and invaded ranges (same as PCAenv in Broenniman et al. 2012)

```
pca.env <- dudi.pca(rbind(nat,inv)[,3:10],scannf=F,nf=2)
```

2.5.1.2 Plot Variables Contribution with *ecospat.plot.contrib()*

```
ecospat.plot.contrib(contrib=pca.env$co, eigen=pca.env$eig)
```



The correlation circle indicate the contribution of original predictors to the PCA axes.

2.5.1.3 Predict the scores on the axes

```
# PCA scores for the whole study area
scores.globclim <- pca.env$li

# PCA scores for the species native distribution
scores.sp.nat <- suprow(pca.env,nat[which(nat[,11]==1),3:10])$li

# PCA scores for the species invasive distribution
scores.sp.inv <- suprow(pca.env,inv[which(inv[,11]==1),3:10])$li

# PCA scores for the whole native study area
scores.clim.nat <- suprow(pca.env,nat[,3:10])$li

# PCA scores for the whole invaded study area
scores.clim.inv <- suprow(pca.env,inv[,3:10])$li
```

2.5.2 Calculate the Occurrence Densities Grid with *ecospat.grid.clim.dyn()*

For a species in the native range (North America)

```
# gridding the native niche
grid.clim.nat <- ecospat.grid.clim.dyn(glob=scores.globclim,
                                       glob1=scores.clim.nat,
                                       sp=scores.sp.nat, R=100,
                                       th.sp=0)
```

For a species in the invaded range (Australia)

```
# gridding the invasive niche
grid.clim.inv <- ecospat.grid.clim.dyn(glob=scores.globclim,
                                       glob1=scores.clim.inv,
                                       sp=scores.sp.inv, R=100,
                                       th.sp=0)
```

2.5.3 Calculate Niche Overlap with *ecospat.niche.overlap()*

```
# Compute Schoener's D, index of niche overlap
D.overlap <- ecospat.niche.overlap (grid.clim.nat, grid.clim.inv, cor=T)$D
D.overlap
```

```
## [1] 0.2243085
```

The niche overlap between the native and the ivaded range is 22%.

2.5.4 Perform the Niche Equivalency Test with *ecospat.niche.equivalency.test()* according to Warren et al. (2008)

It is reccomended to use at least 1000 replications for the equivalency test. As an example we used rep = 10, to reduce the computational time.

```
eq.test <- ecospat.niche.equivalency.test(grid.clim.nat, grid.clim.inv,
                                          rep=10, alternative = "greater")
```

Niche equivalency test H1: Is the overlap between the native and invaded niche higher than two random niches?

2.5.5 Perform the Niche Similarity Test with *ecospat.niche.similarity.test()*

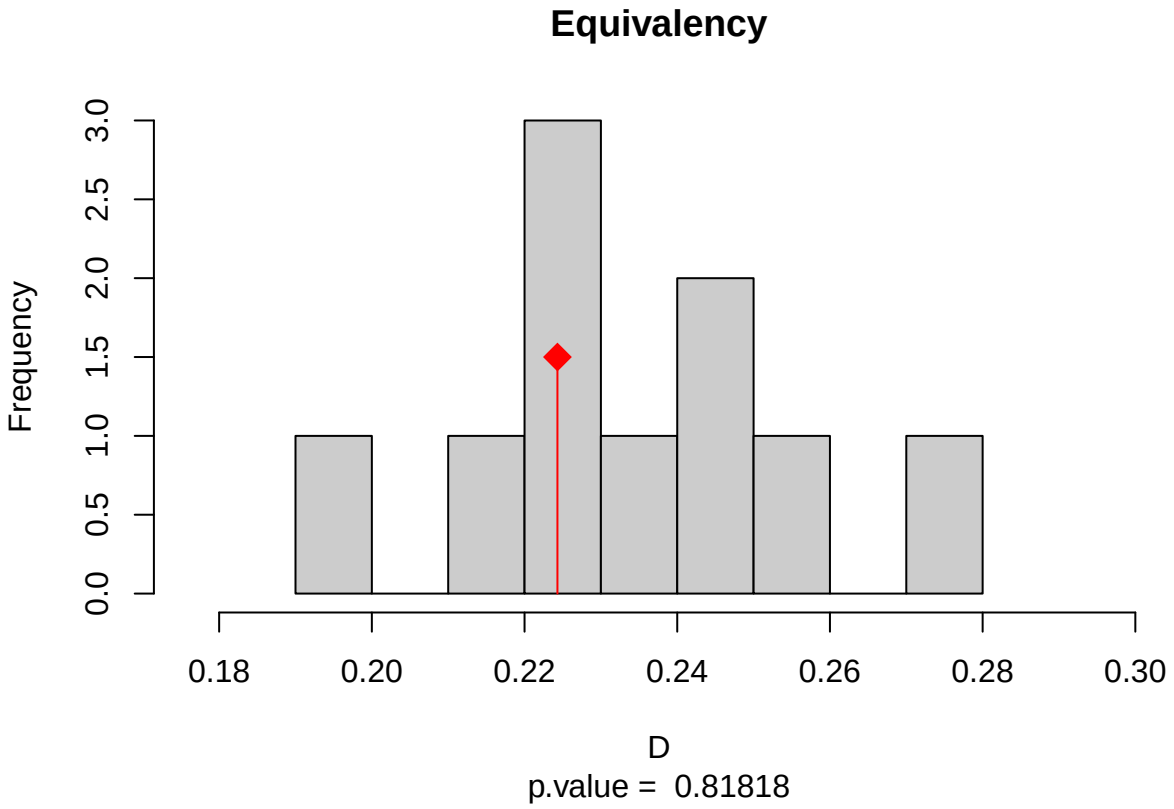
Shifting randomly the invasive niche in the invaded study area It is recomended to use at least 1000 replications for the similarity test. As an example we used rep = 10, to reduce the computational time.

```
sim.test <- ecospat.niche.similarity.test(grid.clim.nat, grid.clim.inv,
                                          rep=10, alternative = "greater",
                                          rand.type=2)
```

Niche similarity test H1: Is the overlap between the native and invaded higher than when the invasive niche is randomly introduced in the invaded study area?

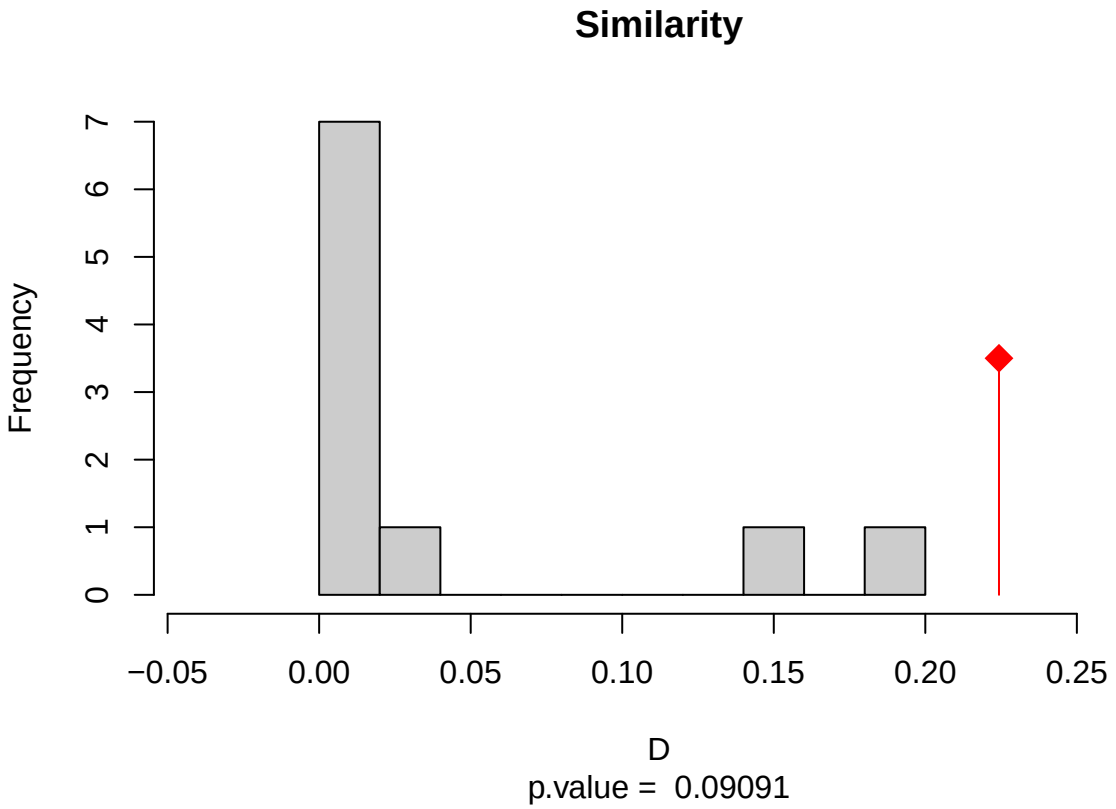
2.5.5.1 Plot Equivalency test

```
ecospat.plot.overlap.test(eq.test, "D", "Equivalency")
```



2.5.5.2 Plot Similarity test

```
ecospat.plot.overlap.test(sim.test, "D", "Similarity")
```



We see that the niche overlap D is 22% and this value is compared to the random distribution of the niche equivalency and niche similarity tests.

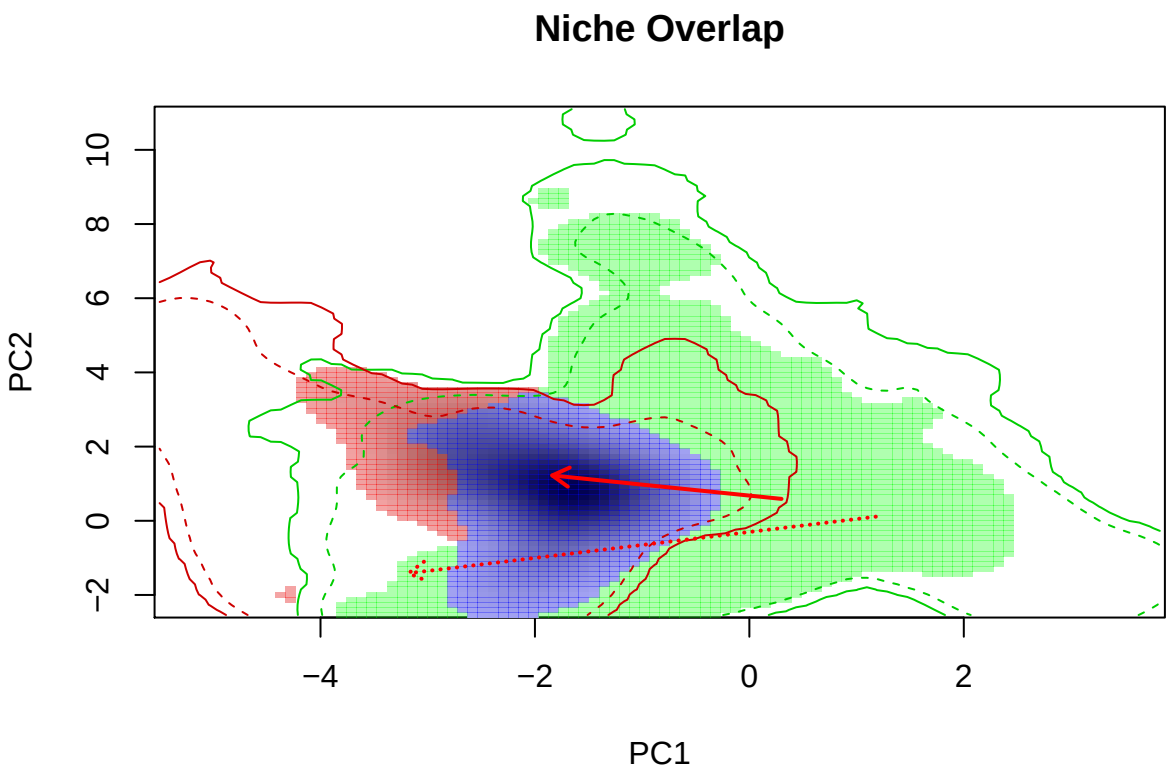
2.5.6 Delimiting niche categories and quantifying niche dynamics in analogue climates with *ecospat.niche.dyn.index()*

```
niche.dyn <- ecospat.niche.dyn.index (grid.clim.nat, grid.clim.inv, intersection = 0.1)
```

2.5.6.1 Visualizing niche categories, niche dynamics and climate analogy between ranges with *ecospat.plot.niche.dyn()*

Plot niche overlap

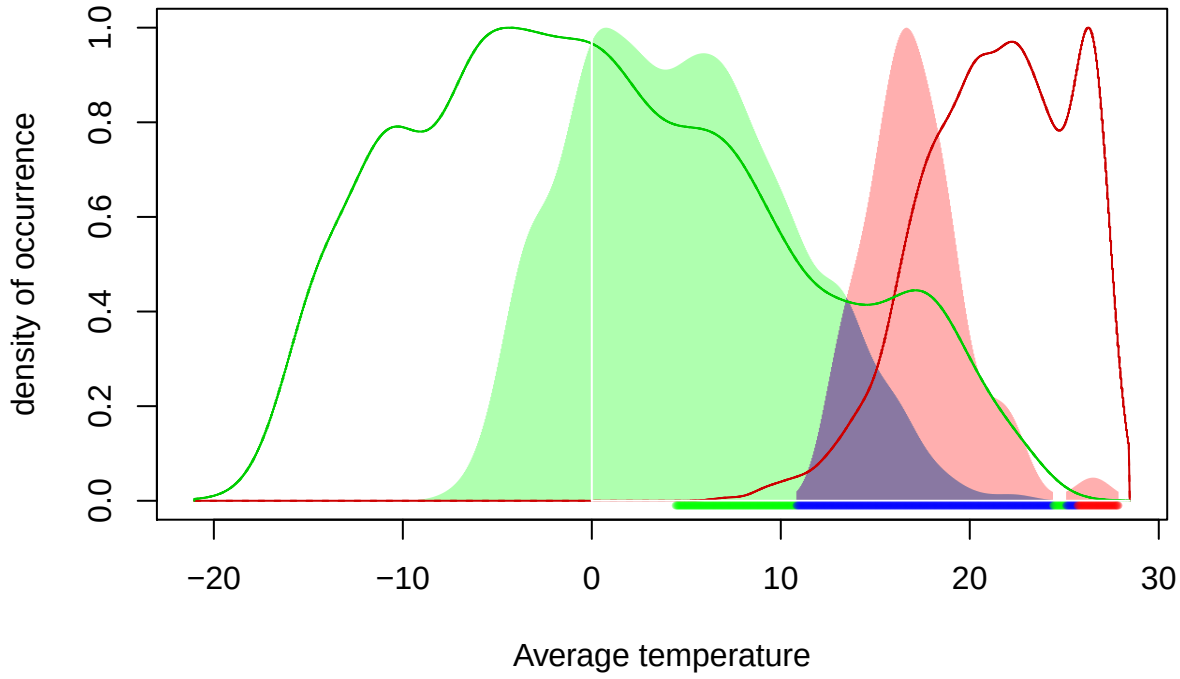
```
ecospat.plot.niche.dyn(grid.clim.nat, grid.clim.inv, quant=0.25, interest=2,
                       title= "Niche Overlap", name.axis1="PC1",
                       name.axis2="PC2")

ecospat.shift.centroids(scores.sp.nat, scores.sp.inv, scores.clim.nat, scores.clim.inv)
```



2.5.6.2 Plot the niche dynamics along one gradient (here temperature) with *ecospat.plot.niche.dyn()*

```
# gridding the native niche
grid.clim.t.nat <- ecospat.grid.clim.dyn(glob=as.data.frame(rbind(nat,inv)[,10]),
                                         glob1=as.data.frame(nat[,10]),
                                    sp=as.data.frame(nat[which(nat[,11]==1),10]),
                                    R=1000, th.sp=0)
# gridding the invaded niche
grid.clim.t.inv <- ecospat.grid.clim.dyn(glob=as.data.frame(rbind(nat,inv)[,10]),
                                         glob1=as.data.frame(inv[,10]),
                                         sp=as.data.frame(inv[which(inv[,11]==1),10]),
                                         R=1000, th.sp=0)
t.dyn<-ecospat.niche.dyn.index (grid.clim.t.nat, grid.clim.t.inv,
                                intersection=0.1)
ecospat.plot.niche.dyn(grid.clim.t.nat, grid.clim.t.inv, quant=0,
```

```
                    interest=2, title= "Niche Overlap",
                    name.axis1="Average temperature")
```



2.6 Biotic Interactions

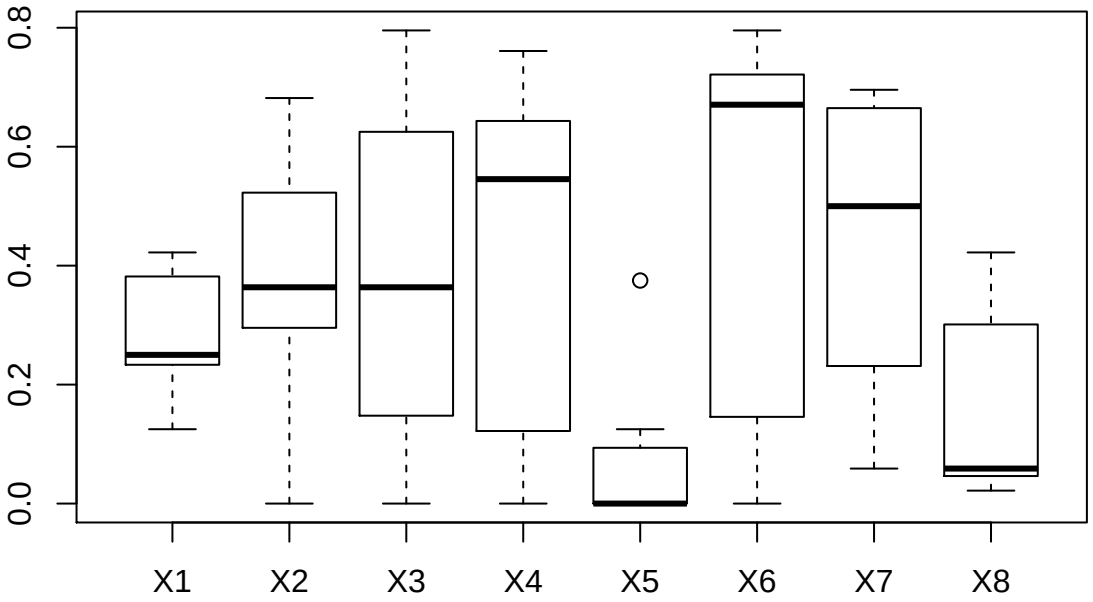
2.6.1 Species Co-occurrences Analysis with a Presence-absence matrix using the function *ecospat.co_occurrences()*

```
data <- ecospat.testData[c(9:16,54:57)]
```

For each pair of species (sp1, sp2), the number (N) of plots where both species were present is divided by the number of plots where the rarest of the two species is present. This index ranges from 0 (no co-occurrence) to 1 (always in co-occurrence) as given in eq. 1.

where N(S1 intersects S2) is the number of times species S1 and S2 co-occur, while Min(NS1, NS2) is the number of times species S1 and S2 co-occur, while is the occurrence frequency of the rarest of the two species.

```
ecospat.co_occurrences (data)
```




```
##                      Aposeris_foetida Arnica_montana Aster_bellidiastrum
## Aposeris_foetida           1.0000000      0.3636364          0.25000000
## Arnica_montana             0.3636364      1.0000000          0.36363636
## Aster_bellidiastrum        0.2500000      0.3636364          1.00000000
## Bartsia_alpina             0.2222222      0.5454545          0.59090909
## Bromus_erectus_sstr        0.1250000      0.0000000          0.00000000
## Campanula_scheuchzeri      0.2444444      0.6818182          0.79545455
## Carex_sempervirens         0.4000000      0.5000000          0.65909091
## Cynosurus_cristatus        0.4222222      0.2272727          0.04545455
##                      Bartsia_alpina Bromus_erectus_sstr
## Aposeris_foetida         0.22222222              0.1250
## Arnica_montana           0.54545455              0.0000
## Aster_bellidiastrum      0.59090909              0.0000
## Bartsia_alpina           1.00000000              0.0000
## Bromus_erectus_sstr      0.00000000              1.0000
## Campanula_scheuchzeri    0.76086957              0.0000
## Carex_sempervirens       0.69565217              0.0625
## Cynosurus_cristatus      0.02173913              0.3750
##                      Campanula_scheuchzeri Carex_sempervirens
## Aposeris_foetida                 0.24444444         0.40000000
## Arnica_montana                   0.68181818         0.50000000
## Aster_bellidiastrum              0.79545455         0.65909091
## Bartsia_alpina                   0.76086957         0.69565217
## Bromus_erectus_sstr              0.00000000         0.06250000
## Campanula_scheuchzeri            1.00000000         0.67058824
## Carex_sempervirens               0.67058824         1.00000000
## Cynosurus_cristatus              0.04705882         0.05882353
##                      Cynosurus_cristatus
## Aposeris_foetida              0.42222222
## Arnica_montana                0.22727273
## Aster_bellidiastrum           0.04545455
## Bartsia_alpina                0.02173913
## Bromus_erectus_sstr           0.37500000
## Campanula_scheuchzeri         0.04705882
## Carex_sempervirens            0.05882353
## Cynosurus_cristatus           1.00000000
```

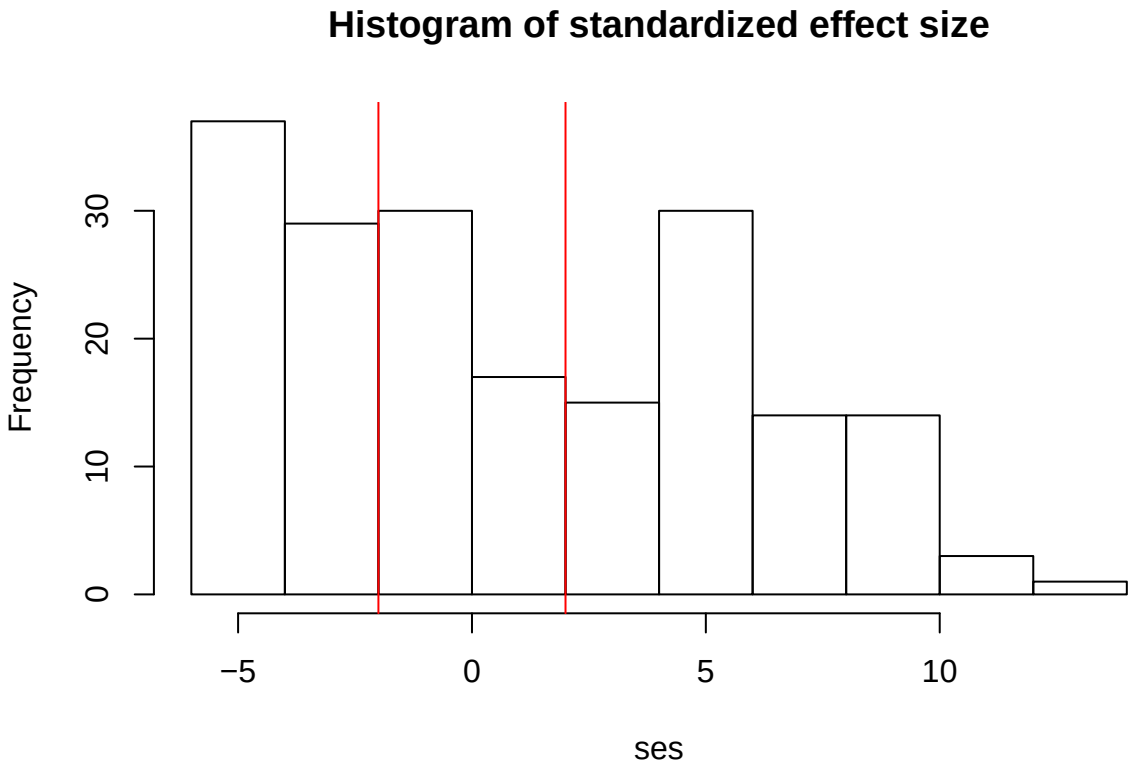
2.6.2 Pairwise co-occurrence Analysis with calculation of the C-score index using the function *ecospat.Cscore()*

This function allows to apply a pairwise null model analysis to a presence-absence community matrix to determine which species associations are significant across the study area. The strength of associations is quantified by the C-score index and a 'fixed-equiprobable' null model algorithm is applied.

It is recomended to use at least 10000 permutatiobns for the test. As an example we used nperm = 100, to reduce the computational time.

```
data<- ecospat.testData[c(53,62,58,70,61,66,65,71,69,43,63,56,68,57,55,60,54,67,59,64)]
nperm <- 100
outpath <- getwd()
ecospat.Cscore(data, nperm, outpath)
```

```
## Computing observed co-occurence matrix
## ............
## ............
## ............
## Computing permutations
## ............
## 100  permutations to go
## ............
## 50  permutations to go
## ............
## Computing P-values
## ............
## Exporting dataset
## ............
## ............
## ............
```




```
## $ObsCscoreTot
## [1] 2675.468
##
## $SimCscoreTot
```

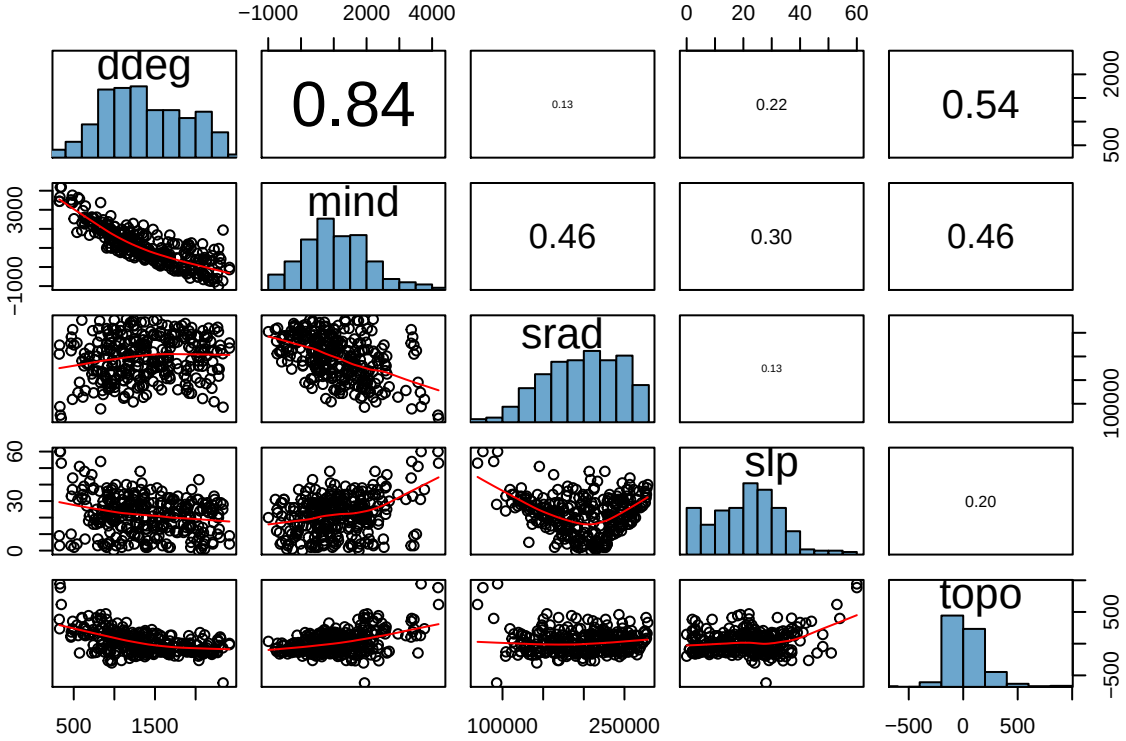
```
## [1] 2465.958
##
## $PVal.less
## [1] 1
##
## $PVal.greater
## [1] 0.00990099
##
## $SES.Tot
## [1] 54.16981
```

The function returns the C-score index for the observed community (ObsCscoreTot), p.value (PValTot) and standardized effect size (SES.Tot). It saves also a table in the working directory where the same metrics are calculated for each species pair (only the table with species pairs with significant p-values is saved in this version)

2.7 Data Preparation

2.7.1 Correlation Plot of Variables with *ecospat.cor.plot()*

```
data <- ecospat.testData[,4:8]
ecospat.cor.plot(data)
```



A scatter plot of matrices, with bivariate scatter plots below the diagonal, histograms on the diagonal, and the Pearson correlation above the diagonal. Useful for descriptive statistics of small data sets (better with less than 10 variables).

2.7.2 Calibration And Evaluation Dataset

```
data <- ecospat.testData
caleval <- ecospat.caleval (data = ecospat.testData[53], xy = data[2:3],
                            row.num = 1:nrow(data), nrep = 2, ratio = 0.7,
                            disaggregate = 0.2, pseudoabs = 100, npres = 10,
```

```
                              replace = FALSE)
caleval
```

```
## $eval
##    yeval yeval
## 1     NA    NA
## 2     NA    NA
## 3     48    91
## 4     16   205
## 5    249   266
## 6    299   166
## 7    235    27
## 8     34   288
## 9    300   134
## 10   239   224
## 11    51   243
## 12   115   253
## 13   297   237
## 14    43   276
## 15    55   229
## 16   120   211
## 17    85   263
## 18   279   240
## 19   246   252
## 20    31     4
## 21   198   232
## 22   270   260
## 23   265    14
## 24    56   116
## 25     2   270
## 26    15   235
## 27    30   230
## 28   231   228
## 29   220   265
## 30   294    17
## 31   295   220
## 32   275   283
## 33   100   140
##
## $cal
##    ycal ycal
## 1   138    1
## 2   280   83
## 3    NA  103
## 4    NA   98
## 5    NA   81
## 6    NA   NA
## 7    NA   25
## 8   201  189
## 9   110  225
## 10  113   44
## 11   17   94
## 12  214  186
## 13  212  259
## 14  248  145
## 15   79  245
## 16  206   33
## 17    5  168
```

```
## 18  255  152
## 19    3  264
## 20  152  193
## 21  261  156
## 22  116  261
## 23   36   85
## 24  254   22
## 25  192  219
## 26  150   71
## 27  236  217
## 28  140  121
## 29  268  239
## 30   33   75
## 31   53   30
## 32   23   95
## 33  262  296
## 34  185  182
## 35  278  249
## 36  273  241
## 37   84  256
## 38  139  222
## 39  286  184
## 40  177  262
## 41  155  274
## 42  200   37
## 43  230   49
## 44  228    3
## 45  223   45
## 46  281  178
## 47  157  244
## 48  283  223
## 49  233  258
## 50  114  269
## 51  106   51
## 52  210   57
## 53  274   67
## 54  203  297
## 55  182  133
## 56  293  292
## 57  196  293
## 58  267  113
## 59  251   21
## 60  247  233
## 61  199  150
## 62   18  272
## 63  178  250
## 64   11  234
## 65  181  291
## 66  188  180
## 67  289  171
## 68   20  196
## 69  238   24
## 70  271    8
## 71   14  169
## 72  256  279
## 73  290  147
## 74  154  210
## 75  242  247
```

```
## 76  168  123
## 77  221  204
```

We obtained an evaluation and calibration dataset with a desired ratio of disaggregation.

3 Core Niche Modelling

3.1 Model Evaluation

3.1.1 Presence-only Evaluation Indices- Boyce Index

The argument fit is a vector containing the predicted suitability values

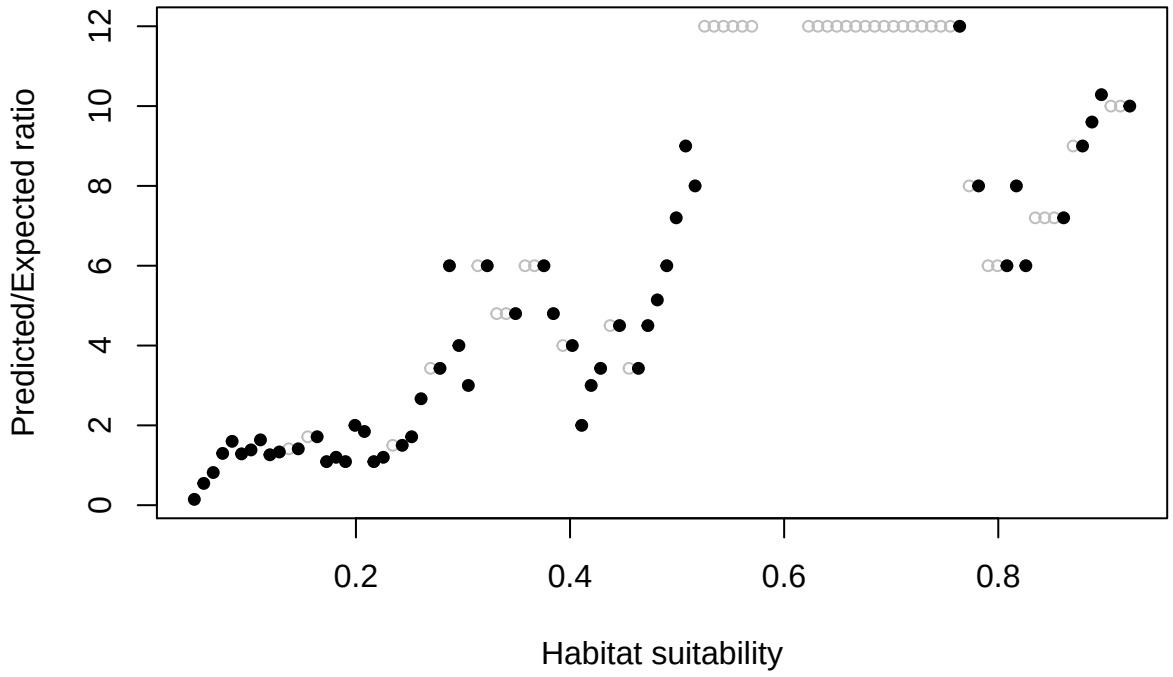
```
fit <- ecospat.testData$glm_Saxifraga_oppositifolia
```

The argument obs is a vector containing the predicted suitability values of the validation points (presence records)

```
obs<-ecospat.testData$glm_Saxifraga_oppositifolia[which(ecospat.testData$Saxifraga_oppositifolia==1)
```

Calculate and plot Boyce Index with *ecospat.boyce*

```
ecospat.boyce (fit, obs, nclass = 0, window.w = "default", res = 100,
               PEplot = TRUE)$Spearman.cor
```




```
## [1] 0.91
```

Here the boyce index is 0.91. If the rank of predicted expected ratio would be completely ordered along habitat suitability axis then boyce index would be 1.

3.1.2 Accuracy of Community Prediction

Indices of accuracy of community predictions *ecospat.CommunityEval()*

```
eval<-ecospat.testData[c(53,62,58,70,61,66,65,71,69,43,63,56,68,57,55,60,54,67,59,64)]
pred<-ecospat.testData[c(73:92)]
```

```
ecospat.CommunityEval (eval, pred, proba=T, ntir=5)
```

```
## trial 1 on 5
## trial 2 on 5
## trial 3 on 5
## trial 4 on 5
## trial 5 on 5
```

```
## $deviation.rich.pred
##       1   2   3   4  5
## 1    -1   2  -1  -2  0
## 2    -6  -4  -7  -8 -6
## 3    -4  -8  -5  -4 -4
## 4    -3  -4  -3  -4 -6
## 5    -7  -8  -8  -9 -8
## 6     1   0   2   1 -3
## 7    -3  -5  -4  -5 -4
## 8    -6  -6  -5  -6 -9
## 9     2   4   2   6  4
## 10   -6  -4  -3  -6 -2
## 11   -4 -11  -6  -8 -9
## 12    1   0  -1  -1  2
## 13   -3   0   1   0 -2
## 14   -4  -2  -3  -5 -4
## 15   -3   1   0   2  0
## 16   -2  -2   0  -2 -4
## 17   -4  -4  -6  -1 -3
## 18   -2  -4  -7  -3 -3
## 19    4   4   2   6  2
## 20   -5  -3  -5  -4 -3
## 21   -3  -4  -3  -5 -3
## 22   -8  -5  -5  -5 -5
## 23   -3  -5  -8  -8 -6
## 24    1   2   2   2  5
## 25   -5  -2  -3  -3 -2
## 26    0   1  -2  -1  0
## 27   -6  -7  -6  -8 -6
## 28    0  -4  -2  -2 -4
## 29    1   3   2   2  0
## 30   -7  -6  -5  -5 -4
## 31   -1   2  -1  -3  0
## 32    0  -2   1   1  3
## 33   -1  -1  -3  -5  1
## 34   -2  -3  -6  -3 -4
## 35    2   1  -2   2  0
## 36   -4  -4  -6  -7 -3
## 37    4   3   2   3  3
## 38   -3  -6  -2  -3 -3
## 39    0   0   1   2  2
## 40   -1  -1  -1  -1 -1
## 41    5   2   4   1  1
## 42    5   4   2   0  4
## 43   -2   0   1  -1  1
## 44   -1   4   3   2  4
## 45    2  -1   2  -1  3
## 46    2   2   2  -1 -3
## 47   -2  -3  -2   1 -2
## 48   -3  -1   1   5 -2
```

```
## 49    0  -2   0  -1  3
## 50    3   1   5   2  4
## 51    2   2   1   4  5
## 52   -5  -5  -2  -6 -3
## 53    2   0   0   3 -2
## 54    4   5   6   1  0
## 55   -4  -1  -5  -2 -3
## 56   -4  -6  -4  -7 -4
## 57   -3  -1   1  -3  2
## 58   -1  -1  -2  -2 -3
## 59    2  -1  -1  -2  1
## 60    0  -1  -4  -1 -1
## 61    2  -1  -1  -2  2
## 62    2   2   3   0 -3
## 63    3   5   2   4  2
## 64   -1  -1   2  -2  1
## 65    4   4   7   6  1
## 66    5   5   5   6  6
## 67    4   2   5   2  4
## 68    7   1   3   2  3
## 69    1   3   2   3  2
## 70    7   4   6   3  4
## 71   -5  -4  -4  -2 -1
## 72    0  -2   1   4  3
## 73    1  -1   2   3  0
## 74    0   0   0   3  3
## 75  -10  -9 -10  -7 -8
## 76    3   4   6   5  4
## 77   -1   0   3   2  3
## 78    4   3  -1   7  2
## 79   -4  -5  -5  -7 -3
## 80    0   0  -1  -2 -1
## 81    6   5   2   4  4
## 82    2   4  -1   2  3
## 83    4   7   3   7  4
## 84   -2  -2  -5   1 -4
## 85   -4  -5  -3  -3 -3
## 86    8   7   6   6  3
## 87    2   6   3   3  2
## 88    2   5   2   2  2
## 89    3   4   3   1  0
## 90    5   2   5   7  3
## 91    4   6   7   6  3
## 92    9   0   3   5  2
## 93    4   5   2   2  3
## 94   -4  -5  -4  -5 -3
## 95    4   3   3   2  6
## 96    6   5   8   6  3
## 97   -1  -2   2  -2  1
## 98    4   3   1   5  0
## 99    6   7   6   9  5
## 100   3   3   3   2  0
## 101   2  -1  -2  -2  0
## 102   2   3   5   2  6
## 103  -1  -2   0   0  1
## 104   3   9   7   3  3
## 105   5   2  -1   3  3
## 106   4   5   3   4  5
```

```
## 107   4   4  -1   0 -2
## 108   3   5   6   4  1
## 109  -1   4   6   2  6
## 110  -5 -11  -9 -12 -7
## 111   3   1   4  -1  2
## 112   2   6   8   6  5
## 113   3   4  -2   1  4
## 114  -4  -2  -7  -4 -3
## 115   0   1   1   2  0
## 116  -3  -7  -6  -5 -2
## 117   7   5   9   5  8
## 118   7   5   7   6  8
## 119   0  -2  -5  -1 -1
## 120  -3  -1  -3  -5  0
## 121  -3   3  -3   2  1
## 122   5   6   4   2  2
## 123   5   6   5   3  5
## 124   5   3   2   2  2
## 125  -1  -1  -4  -2 -3
## 126   3  -2   1   2  5
## 127   7   8   8   6  7
## 128   4   4   6   1  6
## 129   7   5   8   6  6
## 130   1   5   2   3  2
## 131   6   6   2   4  2
## 132   2   6   7   6  5
## 133   1   0   2   2 -3
## 134  -2  -2  -3  -1 -4
## 135   5   4   3   3  8
## 136   3  -1   0  -2  3
## 137   4   1   1   3  4
## 138  -1   2   2   0  2
## 139  -2  -2  -2  -2 -2
## 140  -1  -2   0   0 -3
## 141   2   4   4   5  4
## 142   6   5   2   3  5
## 143  -4  -3  -1   0  0
## 144   5   7   8   6  7
## 145   0  -6  -2  -2 -1
## 146   0  -1  -1   0 -2
## 147  -4   1  -1  -4 -2
## 148   3   5   5   2  3
## 149   6   7   6   8  4
## 150  -1  -2  -2  -6 -2
## 151   1   2   1  -3  2
## 152  -1   0   3  -2 -3
## 153   4   4   3   4  3
## 154   1  -2  -3  -1 -3
## 155   0   3  -1   1  2
## 156  -2  -5  -3  -9 -1
## 157  -3  -4  -4  -6 -3
## 158   4   4   3   5  2
## 159   3   2   5   7  5
## 160  -1  -1   1   2 -1
## 161   0   0   1  -3 -3
## 162   1   1  -1   2  1
## 163   2   4   1   3  0
## 164  -4  -2  -3   1 -4
```

```
## 165   1   0   0   3  0
## 166  -2  -7   1  -3 -6
## 167   2   1   4   2  3
## 168  -4  -5   0  -4 -2
## 169  -2  -4  -3   0 -1
## 170   3   5   3   3  5
## 171  -2  -4   0   1  0
## 172   0  -2  -1   0  0
## 173   8   5   4   4  3
## 174  -1  -3  -4  -5 -4
## 175   1  -2   2   1 -2
## 176   1   1   2   0  0
## 177  -4  -2   0   1 -1
## 178   8   3   2   7  2
## 179   3   4   2   3  2
## 180  -4  -1  -4  -4 -2
## 181  -5  -8  -2  -5 -4
## 182   2   0   4   3  4
## 183   3   4   3   3  1
## 184   0   1   3   0  0
## 185   0   2   0   1  1
## 186  -2  -5  -6  -4 -5
## 187   3   1   1  -1  0
## 188  -1  -1  -3  -1 -1
## 189   1   2   4   3  1
## 190   4   3   5   4  3
## 191  -1   1   0   2  0
## 192  -1  -2  -5  -2  0
## 193  -1  -2  -6  -1  0
## 194   4   5   4   3  4
## 195   2   1   1   2  3
## 196  -4  -4  -5  -1 -4
## 197   2   0   2   5  6
## 198   1  -1  -1   1 -1
## 199  -3  -2  -2  -1 -1
## 200  -4  -1  -2  -1 -3
## 201  -2   0  -1  -1 -2
## 202   3   4   3   3  3
## 203  -2  -3  -2  -3  2
## 204  -1   0   0   1  0
## 205   2   1   0   0  1
## 206  -3  -1   1  -3 -5
## 207   0   1   5   3  5
## 208  -1   3   2   3  3
## 209   1   4   4   2  3
## 210  -6  -5  -2  -3 -1
## 211   0  -1   0  -2 -3
## 212   0   2   1   0  0
## 213   3   4   3   3  3
## 214  -1  -2  -3  -1 -1
## 215  -1   1   2   4  1
## 216   2  -1  -4  -3  3
## 217  -1  -5   0   1 -1
## 218   0   1   1  -2  0
## 219   3  -2   0   2  0
## 220  -1   0   4   2 -1
## 221   1   2   1  -5 -1
## 222  -2  -3   1   2 -5
```

```
## 223  -1   1  -1  -2  0
## 224   3   0  -2   2  0
## 225   0   0   1   3  1
## 226   0   0   1   3  2
## 227   2   2   4   3 -1
## 228  -1  -5  -1  -1 -5
## 229  -3  -2  -3  -2 -3
## 230   1   1   0   3  2
## 231   4   5   5   4  4
## 232   0   1   2  -1  2
## 233   2   0  -1   0  2
## 234   0  -3  -1   0  1
## 235  -3  -2  -2  -2 -3
## 236   1   1  -4  -2 -3
## 237  -1  -1  -1  -3 -4
## 238  -5  -2  -3  -2 -6
## 239  -1   0   0   0 -1
## 240  -1  -2  -2  -3 -3
## 241  -5  -4  -5  -5 -4
## 242  -2  -2  -3   0 -2
## 243   0   0   1   3  0
## 244   0  -4   1   2  3
## 245  -2  -5  -3  -2 -2
## 246   1  -2  -3  -4 -2
## 247  -4  -4  -1  -1  0
## 248  -4   1  -3   1 -1
## 249   1   1   0   2  0
## 250  -1   2  -1   0  0
## 251  -1   1   1  -1 -1
## 252  -1  -4  -1  -2 -1
## 253  -3  -3   0  -1 -2
## 254  -1  -1  -2  -2 -1
## 255  -1  -1  -2   0  0
## 256  -3  -2  -1  -1 -3
## 257   1   0   0   1  0
## 258   1   1  -1  -3 -3
## 259  -1  -4  -4  -4 -1
## 260   0   0   0  -4  0
## 261  -2  -2  -1  -3 -1
## 262  -3  -3  -2  -3 -1
## 263  -2  -3  -2  -1 -4
## 264  -2  -1  -6  -1 -5
## 265  -2  -2   1   1 -1
## 266  -2   0  -4  -3 -1
## 267   1  -1  -1  -2 -3
## 268  -3  -2   0   0  0
## 269  -1  -4  -1  -3 -1
## 270  -3  -2  -1  -3 -2
## 271  -3  -2  -5  -3 -4
## 272  -3  -4   1  -3 -5
## 273   0   1  -2  -3 -2
## 274  -2  -3  -1  -2 -1
## 275   0  -4  -2  -3 -3
## 276  -3  -3  -6  -4 -3
## 277   2   0   4   4  1
## 278  -3  -4  -4  -3 -3
## 279   0   2   1  -2  1
## 280   8   5   9   9  2
```

```
## 281  -4  -1  -2  -1 -3
## 282   3   3   1   2  2
## 283  -2  -2  -2   1  2
## 284   3   2   1   2  0
## 285  -1   0  -3   0 -3
## 286   0   1   1  -1  0
## 287   2   2   2  -1  0
## 288   1   1   1   0  3
## 289   3   1  -2   0  1
## 290   1  -3  -4  -3 -3
## 291   0  -2   2   1  1
## 292   2  -1  -1   1  1
## 293   1  -3  -1  -2 -1
## 294  -2   1   1   1  0
## 295   1   4  -1   2  0
## 296  -1   2   0  -2 -2
## 297   1   0  -2  -1 -3
## 298   4  -1  -3   0  2
## 299   0  -1  -2  -1  0
## 300   0  -1   0   0  0
##
## $overprediction
##              1          2          3          4          5
## 1   0.17647059 0.05882353 0.23529412 0.23529412 0.11764706
## 2   0.37500000 0.25000000 0.50000000 0.50000000 0.43750000
## 3   0.26666667 0.53333333 0.33333333 0.26666667 0.40000000
## 4   0.26666667 0.40000000 0.26666667 0.33333333 0.46666667
## 5   0.38888889 0.44444444 0.44444444 0.50000000 0.44444444
## 6   0.10000000 0.20000000 0.00000000 0.10000000 0.30000000
## 7   0.33333333 0.40000000 0.33333333 0.40000000 0.26666667
## 8   0.46666667 0.40000000 0.40000000 0.46666667 0.60000000
## 9   0.20000000 0.00000000 0.10000000 0.20000000 0.10000000
## 10  0.40000000 0.40000000 0.33333333 0.40000000 0.20000000
## 11  0.20000000 0.55000000 0.30000000 0.40000000 0.45000000
## 12  0.12500000 0.12500000 0.25000000 0.37500000 0.00000000
## 13  0.40000000 0.30000000 0.20000000 0.20000000 0.30000000
## 14  0.38461538 0.23076923 0.38461538 0.46153846 0.38461538
## 15  0.55555556 0.11111111 0.33333333 0.33333333 0.33333333
## 16  0.30000000 0.40000000 0.30000000 0.40000000 0.40000000
## 17  0.28571429 0.35714286 0.50000000 0.14285714 0.35714286
## 18  0.38461538 0.30769231 0.53846154 0.23076923 0.30769231
## 19  0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 20  0.38461538 0.38461538 0.46153846 0.38461538 0.30769231
## 21  0.41666667 0.41666667 0.33333333 0.50000000 0.41666667
## 22  0.61538462 0.38461538 0.53846154 0.46153846 0.46153846
## 23  0.25000000 0.37500000 0.50000000 0.50000000 0.43750000
## 24  0.30000000 0.20000000 0.20000000 0.10000000 0.00000000
## 25  0.37500000 0.25000000 0.31250000 0.37500000 0.18750000
## 26  0.14285714 0.07142857 0.35714286 0.21428571 0.28571429
## 27  0.30000000 0.35000000 0.30000000 0.40000000 0.30000000
## 28  0.30769231 0.38461538 0.46153846 0.38461538 0.38461538
## 29  0.33333333 0.16666667 0.16666667 0.16666667 0.25000000
## 30  0.50000000 0.42857143 0.42857143 0.42857143 0.35714286
## 31  0.40000000 0.10000000 0.40000000 0.40000000 0.50000000
## 32  0.22222222 0.33333333 0.11111111 0.33333333 0.00000000
## 33  0.38461538 0.23076923 0.23076923 0.46153846 0.23076923
## 34  0.23076923 0.30769231 0.46153846 0.30769231 0.30769231
## 35  0.10000000 0.20000000 0.20000000 0.00000000 0.10000000
```

```
## 36  0.33333333 0.58333333 0.50000000 0.58333333 0.33333333
## 37  0.28571429 0.28571429 0.28571429 0.14285714 0.28571429
## 38  0.53846154 0.46153846 0.46153846 0.46153846 0.53846154
## 39  0.40000000 0.30000000 0.40000000 0.40000000 0.40000000
## 40  0.30000000 0.30000000 0.30000000 0.20000000 0.10000000
## 41  0.11111111 0.00000000 0.00000000 0.11111111 0.00000000
## 42  0.00000000 0.10000000 0.30000000 0.10000000 0.40000000
## 43  0.25000000 0.16666667 0.33333333 0.33333333 0.25000000
## 44  0.30000000 0.10000000 0.20000000 0.30000000 0.30000000
## 45  0.10000000 0.30000000 0.10000000 0.30000000 0.10000000
## 46  0.16666667 0.25000000 0.25000000 0.08333333 0.33333333
## 47  0.28571429 0.35714286 0.28571429 0.14285714 0.28571429
## 48  0.41666667 0.41666667 0.25000000 0.00000000 0.41666667
## 49  0.33333333 0.33333333 0.25000000 0.33333333 0.16666667
## 50  0.00000000 0.12500000 0.00000000 0.37500000 0.12500000
## 51  0.11111111 0.11111111 0.22222222 0.22222222 0.00000000
## 52  0.40000000 0.33333333 0.26666667 0.40000000 0.26666667
## 53  0.18181818 0.27272727 0.18181818 0.18181818 0.45454545
## 54  0.12500000 0.25000000 0.00000000 0.12500000 0.25000000
## 55  0.26666667 0.20000000 0.40000000 0.20000000 0.26666667
## 56  0.25000000 0.37500000 0.31250000 0.50000000 0.43750000
## 57  0.36363636 0.45454545 0.45454545 0.45454545 0.09090909
## 58  0.25000000 0.25000000 0.16666667 0.25000000 0.33333333
## 59  0.22222222 0.33333333 0.22222222 0.33333333 0.22222222
## 60  0.14285714 0.28571429 0.42857143 0.21428571 0.28571429
## 61  0.30000000 0.30000000 0.30000000 0.30000000 0.30000000
## 62  0.18181818 0.09090909 0.18181818 0.27272727 0.36363636
## 63  0.18181818 0.09090909 0.18181818 0.09090909 0.18181818
## 64  0.21428571 0.14285714 0.07142857 0.35714286 0.21428571
## 65  0.20000000 0.10000000 0.10000000 0.10000000 0.30000000
## 66  0.11111111 0.11111111 0.11111111 0.22222222 0.00000000
## 67  0.33333333 0.44444444 0.33333333 0.44444444 0.33333333
## 68  0.00000000 0.22222222 0.00000000 0.22222222 0.33333333
## 69  0.36363636 0.45454545 0.36363636 0.18181818 0.27272727
## 70  0.25000000 0.12500000 0.00000000 0.12500000 0.12500000
## 71  0.42857143 0.42857143 0.57142857 0.21428571 0.28571429
## 72  0.20000000 0.40000000 0.10000000 0.10000000 0.30000000
## 73  0.44444444 0.33333333 0.22222222 0.22222222 0.33333333
## 74  0.27272727 0.27272727 0.36363636 0.09090909 0.18181818
## 75  0.50000000 0.45000000 0.50000000 0.35000000 0.40000000
## 76  0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 77  0.37500000 0.37500000 0.12500000 0.12500000 0.25000000
## 78  0.22222222 0.11111111 0.66666667 0.11111111 0.11111111
## 79  0.27777778 0.33333333 0.33333333 0.44444444 0.16666667
## 80  0.23076923 0.30769231 0.38461538 0.46153846 0.38461538
## 81  0.00000000 0.25000000 0.25000000 0.00000000 0.37500000
## 82  0.33333333 0.00000000 0.41666667 0.41666667 0.16666667
## 83  0.25000000 0.12500000 0.12500000 0.00000000 0.00000000
## 84  0.22222222 0.22222222 0.33333333 0.05555556 0.33333333
## 85  0.29411765 0.41176471 0.23529412 0.35294118 0.23529412
## 86  0.00000000 0.10000000 0.00000000 0.10000000 0.30000000
## 87  0.44444444 0.11111111 0.22222222 0.11111111 0.33333333
## 88  0.20000000 0.20000000 0.20000000 0.20000000 0.20000000
## 89  0.16666667 0.08333333 0.16666667 0.33333333 0.33333333
## 90  0.00000000 0.27272727 0.09090909 0.18181818 0.36363636
## 91  0.30000000 0.20000000 0.10000000 0.00000000 0.20000000
## 92  0.11111111 0.33333333 0.22222222 0.00000000 0.44444444
## 93  0.12500000 0.25000000 0.12500000 0.25000000 0.25000000
```

```
## 94  0.35714286 0.50000000 0.50000000 0.42857143 0.28571429
## 95  0.37500000 0.37500000 0.25000000 0.12500000 0.12500000
## 96  0.10000000 0.00000000 0.00000000 0.00000000 0.20000000
## 97  0.30769231 0.30769231 0.23076923 0.38461538 0.15384615
## 98  0.36363636 0.09090909 0.36363636 0.18181818 0.18181818
## 99  0.33333333 0.11111111 0.11111111 0.11111111 0.33333333
## 100 0.16666667 0.25000000 0.16666667 0.25000000 0.33333333
## 101 0.07692308 0.15384615 0.38461538 0.38461538 0.38461538
## 102 0.08333333 0.16666667 0.08333333 0.08333333 0.00000000
## 103 0.25000000 0.33333333 0.41666667 0.25000000 0.33333333
## 104 0.37500000 0.00000000 0.12500000 0.37500000 0.12500000
## 105 0.07692308 0.07692308 0.30769231 0.15384615 0.15384615
## 106 0.07692308 0.00000000 0.07692308 0.23076923 0.15384615
## 107 0.07142857 0.14285714 0.35714286 0.28571429 0.35714286
## 108 0.10000000 0.10000000 0.10000000 0.20000000 0.40000000
## 109 0.55555556 0.33333333 0.11111111 0.33333333 0.11111111
## 110 0.25000000 0.55000000 0.45000000 0.60000000 0.35000000
## 111 0.25000000 0.25000000 0.16666667 0.33333333 0.16666667
## 112 0.50000000 0.20000000 0.00000000 0.10000000 0.10000000
## 113 0.25000000 0.16666667 0.41666667 0.33333333 0.16666667
## 114 0.35294118 0.29411765 0.47058824 0.35294118 0.23529412
## 115 0.25000000 0.25000000 0.41666667 0.16666667 0.25000000
## 116 0.21052632 0.36842105 0.31578947 0.31578947 0.15789474
## 117 0.11111111 0.22222222 0.00000000 0.11111111 0.11111111
## 118 0.14285714 0.28571429 0.28571429 0.14285714 0.00000000
## 119 0.11764706 0.23529412 0.35294118 0.17647059 0.17647059
## 120 0.29411765 0.17647059 0.35294118 0.41176471 0.17647059
## 121 0.42857143 0.14285714 0.50000000 0.14285714 0.21428571
## 122 0.00000000 0.22222222 0.11111111 0.33333333 0.33333333
## 123 0.27272727 0.18181818 0.18181818 0.27272727 0.18181818
## 124 0.00000000 0.07142857 0.14285714 0.14285714 0.21428571
## 125 0.16666667 0.16666667 0.27777778 0.22222222 0.22222222
## 126 0.33333333 0.33333333 0.16666667 0.25000000 0.16666667
## 127 0.00000000 0.00000000 0.11111111 0.11111111 0.11111111
## 128 0.22222222 0.22222222 0.00000000 0.22222222 0.11111111
## 129 0.10000000 0.10000000 0.00000000 0.10000000 0.10000000
## 130 0.20000000 0.00000000 0.20000000 0.10000000 0.30000000
## 131 0.20000000 0.10000000 0.40000000 0.20000000 0.30000000
## 132 0.30000000 0.20000000 0.00000000 0.10000000 0.30000000
## 133 0.13333333 0.26666667 0.13333333 0.00000000 0.33333333
## 134 0.26666667 0.26666667 0.40000000 0.26666667 0.40000000
## 135 0.33333333 0.44444444 0.44444444 0.22222222 0.22222222
## 136 0.16666667 0.41666667 0.33333333 0.41666667 0.25000000
## 137 0.18181818 0.36363636 0.18181818 0.27272727 0.18181818
## 138 0.30769231 0.23076923 0.23076923 0.30769231 0.15384615
## 139 0.31250000 0.37500000 0.31250000 0.37500000 0.25000000
## 140 0.23529412 0.23529412 0.11764706 0.11764706 0.23529412
## 141 0.16666667 0.08333333 0.08333333 0.00000000 0.08333333
## 142 0.00000000 0.16666667 0.16666667 0.16666667 0.00000000
## 143 0.31250000 0.31250000 0.25000000 0.25000000 0.18750000
## 144 0.00000000 0.10000000 0.00000000 0.20000000 0.00000000
## 145 0.26666667 0.53333333 0.33333333 0.20000000 0.20000000
## 146 0.33333333 0.26666667 0.40000000 0.13333333 0.33333333
## 147 0.37500000 0.12500000 0.31250000 0.31250000 0.31250000
## 148 0.25000000 0.08333333 0.16666667 0.25000000 0.25000000
## 149 0.00000000 0.10000000 0.40000000 0.10000000 0.30000000
## 150 0.11111111 0.16666667 0.16666667 0.33333333 0.16666667
## 151 0.14285714 0.14285714 0.14285714 0.28571429 0.28571429
```

```
## 152 0.18750000 0.18750000 0.00000000 0.31250000 0.18750000
## 153 0.18181818 0.18181818 0.00000000 0.18181818 0.27272727
## 154 0.11764706 0.23529412 0.35294118 0.11764706 0.35294118
## 155 0.20000000 0.06666667 0.26666667 0.13333333 0.13333333
## 156 0.10000000 0.25000000 0.15000000 0.45000000 0.05000000
## 157 0.15000000 0.20000000 0.20000000 0.30000000 0.15000000
## 158 0.18181818 0.27272727 0.18181818 0.18181818 0.36363636
## 159 0.18181818 0.27272727 0.18181818 0.09090909 0.09090909
## 160 0.23529412 0.23529412 0.05882353 0.05882353 0.11764706
## 161 0.12500000 0.25000000 0.06250000 0.25000000 0.31250000
## 162 0.06666667 0.13333333 0.26666667 0.13333333 0.13333333
## 163 0.13333333 0.00000000 0.13333333 0.06666667 0.13333333
## 164 0.31250000 0.31250000 0.25000000 0.12500000 0.37500000
## 165 0.12500000 0.06250000 0.06250000 0.06250000 0.12500000
## 166 0.22222222 0.38888889 0.05555556 0.22222222 0.38888889
## 167 0.15384615 0.23076923 0.15384615 0.15384615 0.23076923
## 168 0.27777778 0.38888889 0.11111111 0.27777778 0.16666667
## 169 0.15789474 0.21052632 0.21052632 0.05263158 0.10526316
## 170 0.07692308 0.07692308 0.15384615 0.15384615 0.00000000
## 171 0.25000000 0.50000000 0.18750000 0.18750000 0.12500000
## 172 0.20000000 0.33333333 0.33333333 0.20000000 0.20000000
## 173 0.00000000 0.10000000 0.30000000 0.20000000 0.30000000
## 174 0.16666667 0.22222222 0.27777778 0.33333333 0.27777778
## 175 0.41666667 0.50000000 0.16666667 0.25000000 0.41666667
## 176 0.21428571 0.28571429 0.07142857 0.14285714 0.21428571
## 177 0.29411765 0.23529412 0.11764706 0.11764706 0.11764706
## 178 0.00000000 0.36363636 0.36363636 0.18181818 0.45454545
## 179 0.16666667 0.25000000 0.16666667 0.16666667 0.16666667
## 180 0.29411765 0.11764706 0.29411765 0.29411765 0.17647059
## 181 0.25000000 0.40000000 0.10000000 0.25000000 0.20000000
## 182 0.28571429 0.35714286 0.07142857 0.14285714 0.00000000
## 183 0.00000000 0.00000000 0.06666667 0.13333333 0.13333333
## 184 0.20000000 0.06666667 0.06666667 0.20000000 0.26666667
## 185 0.20000000 0.13333333 0.33333333 0.13333333 0.13333333
## 186 0.10526316 0.26315789 0.31578947 0.21052632 0.26315789
## 187 0.06666667 0.13333333 0.13333333 0.26666667 0.33333333
## 188 0.17647059 0.11764706 0.29411765 0.17647059 0.11764706
## 189 0.20000000 0.06666667 0.06666667 0.06666667 0.20000000
## 190 0.16666667 0.25000000 0.08333333 0.25000000 0.25000000
## 191 0.26666667 0.20000000 0.20000000 0.06666667 0.20000000
## 192 0.17647059 0.29411765 0.41176471 0.11764706 0.11764706
## 193 0.10526316 0.10526316 0.31578947 0.10526316 0.05263158
## 194 0.07142857 0.00000000 0.07142857 0.21428571 0.07142857
## 195 0.07692308 0.07692308 0.30769231 0.07692308 0.23076923
## 196 0.21052632 0.26315789 0.31578947 0.10526316 0.26315789
## 197 0.16666667 0.08333333 0.16666667 0.00000000 0.08333333
## 198 0.00000000 0.11111111 0.16666667 0.05555556 0.11111111
## 199 0.27777778 0.22222222 0.22222222 0.11111111 0.11111111
## 200 0.27777778 0.16666667 0.16666667 0.11111111 0.16666667
## 201 0.11111111 0.11111111 0.16666667 0.11111111 0.16666667
## 202 0.08333333 0.00000000 0.00000000 0.08333333 0.08333333
## 203 0.31250000 0.31250000 0.31250000 0.37500000 0.12500000
## 204 0.18750000 0.12500000 0.18750000 0.06250000 0.18750000
## 205 0.00000000 0.05882353 0.11764706 0.11764706 0.05882353
## 206 0.22222222 0.16666667 0.05555556 0.27777778 0.33333333
## 207 0.21428571 0.14285714 0.07142857 0.00000000 0.00000000
## 208 0.13333333 0.13333333 0.06666667 0.00000000 0.06666667
## 209 0.28571429 0.14285714 0.00000000 0.14285714 0.07142857
```

```
## 210 0.31578947 0.26315789 0.10526316 0.15789474 0.05263158
## 211 0.05555556 0.11111111 0.05555556 0.16666667 0.16666667
## 212 0.12500000 0.06250000 0.12500000 0.12500000 0.12500000
## 213 0.13333333 0.06666667 0.06666667 0.06666667 0.00000000
## 214 0.17647059 0.17647059 0.17647059 0.11764706 0.11764706
## 215 0.26666667 0.13333333 0.13333333 0.06666667 0.13333333
## 216 0.12500000 0.25000000 0.31250000 0.25000000 0.00000000
## 217 0.25000000 0.37500000 0.18750000 0.18750000 0.18750000
## 218 0.13333333 0.06666667 0.06666667 0.20000000 0.13333333
## 219 0.06666667 0.26666667 0.13333333 0.06666667 0.20000000
## 220 0.20000000 0.20000000 0.00000000 0.13333333 0.13333333
## 221 0.05882353 0.00000000 0.05882353 0.29411765 0.11764706
## 222 0.23529412 0.17647059 0.00000000 0.00000000 0.29411765
## 223 0.10526316 0.00000000 0.10526316 0.10526316 0.05263158
## 224 0.06250000 0.06250000 0.25000000 0.12500000 0.18750000
## 225 0.06250000 0.12500000 0.06250000 0.00000000 0.12500000
## 226 0.14285714 0.14285714 0.00000000 0.07142857 0.00000000
## 227 0.21428571 0.07142857 0.07142857 0.00000000 0.28571429
## 228 0.10526316 0.31578947 0.10526316 0.05263158 0.26315789
## 229 0.21052632 0.15789474 0.15789474 0.15789474 0.15789474
## 230 0.12500000 0.12500000 0.12500000 0.00000000 0.06250000
## 231 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 232 0.13333333 0.13333333 0.00000000 0.20000000 0.00000000
## 233 0.06250000 0.12500000 0.25000000 0.12500000 0.06250000
## 234 0.11764706 0.29411765 0.17647059 0.17647059 0.05882353
## 235 0.15789474 0.15789474 0.15789474 0.15789474 0.21052632
## 236 0.05882353 0.05882353 0.29411765 0.23529412 0.23529412
## 237 0.16666667 0.11111111 0.16666667 0.22222222 0.33333333
## 238 0.31578947 0.15789474 0.21052632 0.15789474 0.36842105
## 239 0.17647059 0.17647059 0.17647059 0.17647059 0.17647059
## 240 0.11111111 0.22222222 0.16666667 0.22222222 0.16666667
## 241 0.31578947 0.21052632 0.26315789 0.31578947 0.26315789
## 242 0.15789474 0.15789474 0.21052632 0.05263158 0.10526316
## 243 0.11764706 0.11764706 0.00000000 0.00000000 0.11764706
## 244 0.05882353 0.23529412 0.00000000 0.05882353 0.00000000
## 245 0.10000000 0.25000000 0.15000000 0.10000000 0.10000000
## 246 0.00000000 0.15789474 0.15789474 0.21052632 0.15789474
## 247 0.21052632 0.21052632 0.10526316 0.10526316 0.05263158
## 248 0.23529412 0.05882353 0.17647059 0.05882353 0.11764706
## 249 0.12500000 0.06250000 0.06250000 0.00000000 0.12500000
## 250 0.05882353 0.00000000 0.05882353 0.11764706 0.05882353
## 251 0.11764706 0.05882353 0.11764706 0.23529412 0.11764706
## 252 0.05000000 0.20000000 0.05000000 0.10000000 0.05000000
## 253 0.21052632 0.15789474 0.05263158 0.10526316 0.15789474
## 254 0.05263158 0.05263158 0.15789474 0.10526316 0.10526316
## 255 0.11111111 0.11111111 0.11111111 0.05555556 0.05555556
## 256 0.16666667 0.11111111 0.05555556 0.05555556 0.16666667
## 257 0.06250000 0.18750000 0.18750000 0.12500000 0.18750000
## 258 0.05555556 0.05555556 0.16666667 0.16666667 0.16666667
## 259 0.16666667 0.22222222 0.22222222 0.22222222 0.11111111
## 260 0.11111111 0.05555556 0.05555556 0.27777778 0.11111111
## 261 0.16666667 0.22222222 0.11111111 0.27777778 0.16666667
## 262 0.15000000 0.15000000 0.10000000 0.15000000 0.05000000
## 263 0.10000000 0.15000000 0.10000000 0.05000000 0.20000000
## 264 0.10526316 0.10526316 0.31578947 0.10526316 0.26315789
## 265 0.17647059 0.11764706 0.05882353 0.05882353 0.05882353
## 266 0.15789474 0.05263158 0.21052632 0.15789474 0.05263158
## 267 0.00000000 0.05555556 0.05555556 0.11111111 0.16666667
```

```
## 268 0.16666667 0.16666667 0.00000000 0.05555556 0.05555556
## 269 0.05263158 0.21052632 0.05263158 0.15789474 0.05263158
## 270 0.15789474 0.10526316 0.05263158 0.15789474 0.10526316
## 271 0.15789474 0.10526316 0.26315789 0.21052632 0.21052632
## 272 0.15789474 0.21052632 0.00000000 0.15789474 0.26315789
## 273 0.11111111 0.05555556 0.22222222 0.22222222 0.11111111
## 274 0.10526316 0.15789474 0.05263158 0.10526316 0.05263158
## 275 0.05555556 0.27777778 0.11111111 0.16666667 0.16666667
## 276 0.35714286 0.42857143 0.57142857 0.42857143 0.35714286
## 277 0.25000000 0.16666667 0.25000000 0.25000000 0.16666667
## 278 0.30769231 0.38461538 0.61538462 0.46153846 0.38461538
## 279 0.30769231 0.15384615 0.15384615 0.23076923 0.23076923
## 280 0.11111111 0.33333333 0.00000000 0.00000000 0.22222222
## 281 0.21052632 0.05263158 0.10526316 0.05263158 0.15789474
## 282 0.23076923 0.07692308 0.23076923 0.23076923 0.30769231
## 283 0.16666667 0.16666667 0.16666667 0.05555556 0.00000000
## 284 0.21428571 0.14285714 0.21428571 0.28571429 0.28571429
## 285 0.17647059 0.11764706 0.29411765 0.11764706 0.23529412
## 286 0.17647059 0.05882353 0.05882353 0.17647059 0.17647059
## 287 0.06666667 0.06666667 0.06666667 0.13333333 0.13333333
## 288 0.11764706 0.05882353 0.11764706 0.11764706 0.00000000
## 289 0.00000000 0.06250000 0.18750000 0.12500000 0.00000000
## 290 0.05555556 0.27777778 0.27777778 0.16666667 0.22222222
## 291 0.11764706 0.17647059 0.05882353 0.05882353 0.11764706
## 292 0.00000000 0.17647059 0.17647059 0.05882353 0.05882353
## 293 0.18750000 0.25000000 0.12500000 0.18750000 0.12500000
## 294 0.25000000 0.06250000 0.06250000 0.06250000 0.12500000
## 295 0.18750000 0.00000000 0.18750000 0.00000000 0.00000000
## 296 0.17647059 0.00000000 0.05882353 0.23529412 0.17647059
## 297 0.05882353 0.11764706 0.17647059 0.17647059 0.29411765
## 298 0.30000000 0.50000000 0.30000000 0.20000000 0.20000000
## 299 0.05555556 0.05555556 0.11111111 0.05555556 0.05555556
## 300 0.11111111 0.11111111 0.11111111 0.05555556 0.05555556
##
## $underprediction
##             1          2          3          4          5
## 1   0.6666667 1.00000000 1.00000000 0.66666667 0.66666667
## 2   0.0000000 0.00000000 0.25000000 0.00000000 0.25000000
## 3   0.0000000 0.00000000 0.00000000 0.00000000 0.40000000
## 4   0.2000000 0.40000000 0.20000000 0.20000000 0.20000000
## 5   0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 6   0.2000000 0.20000000 0.20000000 0.20000000 0.00000000
## 7   0.4000000 0.20000000 0.20000000 0.20000000 0.00000000
## 8   0.2000000 0.00000000 0.20000000 0.20000000 0.00000000
## 9   0.4000000 0.40000000 0.30000000 0.80000000 0.50000000
## 10  0.0000000 0.40000000 0.40000000 0.00000000 0.20000000
## 11        NaN        NaN        NaN        NaN        NaN
## 12  0.1666667 0.08333333 0.08333333 0.16666667 0.16666667
## 13  0.1000000 0.30000000 0.30000000 0.20000000 0.10000000
## 14  0.1428571 0.14285714 0.28571429 0.14285714 0.14285714
## 15  0.1818182 0.18181818 0.27272727 0.45454545 0.27272727
## 16  0.1000000 0.20000000 0.30000000 0.20000000 0.00000000
## 17  0.0000000 0.16666667 0.16666667 0.16666667 0.33333333
## 18  0.4285714 0.00000000 0.00000000 0.00000000 0.14285714
## 19  0.2666667 0.26666667 0.13333333 0.40000000 0.13333333
## 20  0.0000000 0.28571429 0.14285714 0.14285714 0.14285714
## 21  0.2500000 0.12500000 0.12500000 0.12500000 0.25000000
## 22  0.0000000 0.00000000 0.28571429 0.14285714 0.14285714
```

```
## 23  0.2500000 0.25000000 0.00000000 0.00000000 0.25000000
## 24  0.4000000 0.40000000 0.40000000 0.30000000 0.50000000
## 25  0.2500000 0.50000000 0.50000000 0.75000000 0.25000000
## 26  0.3333333 0.33333333 0.50000000 0.33333333 0.66666667
## 27        NaN        NaN        NaN        NaN        NaN
## 28  0.5714286 0.14285714 0.57142857 0.42857143 0.14285714
## 29  0.6250000 0.62500000 0.50000000 0.50000000 0.37500000
## 30  0.0000000 0.00000000 0.16666667 0.16666667 0.16666667
## 31  0.3000000 0.30000000 0.30000000 0.10000000 0.50000000
## 32  0.1818182 0.09090909 0.18181818 0.36363636 0.27272727
## 33  0.5714286 0.28571429 0.00000000 0.14285714 0.57142857
## 34  0.1428571 0.14285714 0.00000000 0.14285714 0.00000000
## 35  0.3000000 0.30000000 0.00000000 0.20000000 0.10000000
## 36  0.0000000 0.37500000 0.00000000 0.00000000 0.12500000
## 37  0.4615385 0.38461538 0.30769231 0.30769231 0.38461538
## 38  0.5714286 0.00000000 0.57142857 0.42857143 0.57142857
## 39  0.4000000 0.30000000 0.50000000 0.60000000 0.60000000
## 40  0.2000000 0.20000000 0.20000000 0.10000000 0.00000000
## 41  0.5454545 0.18181818 0.36363636 0.18181818 0.09090909
## 42  0.5000000 0.50000000 0.50000000 0.10000000 0.80000000
## 43  0.1250000 0.25000000 0.62500000 0.37500000 0.50000000
## 44  0.2000000 0.50000000 0.50000000 0.50000000 0.70000000
## 45  0.3000000 0.20000000 0.30000000 0.20000000 0.40000000
## 46  0.5000000 0.62500000 0.62500000 0.00000000 0.12500000
## 47  0.3333333 0.33333333 0.33333333 0.50000000 0.33333333
## 48  0.2500000 0.50000000 0.50000000 0.62500000 0.37500000
## 49  0.5000000 0.25000000 0.37500000 0.37500000 0.62500000
## 50  0.2500000 0.16666667 0.41666667 0.41666667 0.41666667
## 51  0.2727273 0.27272727 0.27272727 0.54545455 0.45454545
## 52  0.2000000 0.00000000 0.40000000 0.00000000 0.20000000
## 53  0.4444444 0.33333333 0.22222222 0.55555556 0.33333333
## 54  0.4166667 0.58333333 0.50000000 0.16666667 0.16666667
## 55  0.0000000 0.40000000 0.20000000 0.20000000 0.20000000
## 56  0.0000000 0.00000000 0.25000000 0.25000000 0.75000000
## 57  0.1111111 0.44444444 0.66666667 0.22222222 0.33333333
## 58  0.2500000 0.25000000 0.00000000 0.12500000 0.12500000
## 59  0.3636364 0.18181818 0.09090909 0.09090909 0.27272727
## 60  0.3333333 0.50000000 0.33333333 0.33333333 0.50000000
## 61  0.5000000 0.20000000 0.20000000 0.10000000 0.50000000
## 62  0.4444444 0.33333333 0.55555556 0.33333333 0.11111111
## 63  0.5555556 0.66666667 0.44444444 0.55555556 0.44444444
## 64  0.3333333 0.16666667 0.50000000 0.50000000 0.66666667
## 65  0.6000000 0.50000000 0.80000000 0.70000000 0.40000000
## 66  0.5454545 0.54545455 0.54545455 0.72727273 0.54545455
## 67  0.6363636 0.54545455 0.72727273 0.54545455 0.63636364
## 68  0.6363636 0.27272727 0.27272727 0.36363636 0.54545455
## 69  0.5555556 0.88888889 0.66666667 0.55555556 0.55555556
## 70  0.7500000 0.41666667 0.50000000 0.33333333 0.41666667
## 71  0.1666667 0.33333333 0.66666667 0.16666667 0.50000000
## 72  0.2000000 0.20000000 0.20000000 0.50000000 0.60000000
## 73  0.4545455 0.18181818 0.36363636 0.45454545 0.27272727
## 74  0.3333333 0.33333333 0.44444444 0.44444444 0.55555556
## 75        NaN        NaN        NaN        NaN        NaN
## 76  0.2142857 0.28571429 0.42857143 0.35714286 0.28571429
## 77  0.1666667 0.25000000 0.33333333 0.25000000 0.41666667
## 78  0.5454545 0.36363636 0.45454545 0.72727273 0.27272727
## 79  0.5000000 0.50000000 0.50000000 0.50000000 0.00000000
## 80  0.4285714 0.57142857 0.57142857 0.57142857 0.57142857
```

```
## 81  0.5000000 0.58333333 0.33333333 0.33333333 0.58333333
## 82  0.7500000 0.50000000 0.50000000 0.87500000 0.62500000
## 83  0.5000000 0.66666667 0.33333333 0.58333333 0.33333333
## 84  1.0000000 1.00000000 0.50000000 1.00000000 1.00000000
## 85  0.3333333 0.66666667 0.33333333 1.00000000 0.33333333
## 86  0.8000000 0.80000000 0.60000000 0.70000000 0.60000000
## 87  0.5454545 0.63636364 0.45454545 0.36363636 0.45454545
## 88  0.4000000 0.70000000 0.40000000 0.40000000 0.40000000
## 89  0.6250000 0.62500000 0.62500000 0.62500000 0.50000000
## 90  0.5555556 0.55555556 0.66666667 1.00000000 0.77777778
## 91  0.7000000 0.80000000 0.80000000 0.60000000 0.50000000
## 92  0.9090909 0.27272727 0.45454545 0.45454545 0.54545455
## 93  0.4166667 0.58333333 0.25000000 0.33333333 0.41666667
## 94  0.1666667 0.33333333 0.50000000 0.16666667 0.16666667
## 95  0.5833333 0.50000000 0.41666667 0.25000000 0.58333333
## 96  0.7000000 0.50000000 0.80000000 0.60000000 0.50000000
## 97  0.4285714 0.28571429 0.71428571 0.42857143 0.42857143
## 98  0.8888889 0.44444444 0.55555556 0.77777778 0.22222222
## 99  0.8181818 0.72727273 0.63636364 0.90909091 0.72727273
## 100 0.6250000 0.75000000 0.62500000 0.62500000 0.50000000
## 101 0.4285714 0.14285714 0.42857143 0.42857143 0.71428571
## 102 0.3750000 0.62500000 0.75000000 0.37500000 0.75000000
## 103 0.2500000 0.25000000 0.62500000 0.37500000 0.62500000
## 104 0.5000000 0.75000000 0.66666667 0.50000000 0.33333333
## 105 0.8571429 0.42857143 0.42857143 0.71428571 0.71428571
## 106 0.7142857 0.71428571 0.57142857 1.00000000 1.00000000
## 107 0.8333333 1.00000000 0.66666667 0.66666667 0.50000000
## 108 0.4000000 0.60000000 0.70000000 0.60000000 0.50000000
## 109 0.3636364 0.63636364 0.63636364 0.45454545 0.63636364
## 110       NaN        NaN        NaN        NaN        NaN
## 111 0.7500000 0.50000000 0.75000000 0.37500000 0.50000000
## 112 0.7000000 0.80000000 0.80000000 0.70000000 0.60000000
## 113 0.7500000 0.75000000 0.37500000 0.62500000 0.75000000
## 114 0.6666667 1.00000000 0.33333333 0.66666667 0.33333333
## 115 0.3750000 0.50000000 0.75000000 0.50000000 0.37500000
## 116 1.0000000 0.00000000 0.00000000 1.00000000 1.00000000
## 117 0.7272727 0.63636364 0.81818182 0.54545455 0.81818182
## 118 0.6153846 0.53846154 0.69230769 0.53846154 0.61538462
## 119 0.6666667 0.66666667 0.33333333 0.66666667 0.66666667
## 120 0.6666667 0.66666667 1.00000000 0.66666667 1.00000000
## 121 0.5000000 0.83333333 0.66666667 0.66666667 0.66666667
## 122 0.4545455 0.72727273 0.45454545 0.45454545 0.45454545
## 123 0.8888889 0.88888889 0.77777778 0.66666667 0.77777778
## 124 0.8333333 0.66666667 0.66666667 0.66666667 0.83333333
## 125 1.0000000 1.00000000 0.50000000 1.00000000 0.50000000
## 126 0.8750000 0.25000000 0.37500000 0.62500000 0.87500000
## 127 0.6363636 0.72727273 0.81818182 0.63636364 0.72727273
## 128 0.5454545 0.54545455 0.54545455 0.27272727 0.63636364
## 129 0.8000000 0.60000000 0.80000000 0.70000000 0.70000000
## 130 0.3000000 0.50000000 0.40000000 0.40000000 0.50000000
## 131 0.8000000 0.70000000 0.60000000 0.60000000 0.50000000
## 132 0.5000000 0.80000000 0.70000000 0.70000000 0.80000000
## 133 0.6000000 0.80000000 0.80000000 0.40000000 0.40000000
## 134 0.4000000 0.40000000 0.60000000 0.60000000 0.40000000
## 135 0.7272727 0.72727273 0.63636364 0.45454545 0.90909091
## 136 0.6250000 0.50000000 0.50000000 0.37500000 0.75000000
## 137 0.6666667 0.55555556 0.33333333 0.66666667 0.66666667
## 138 0.4285714 0.71428571 0.71428571 0.57142857 0.57142857
```

```
## 139 0.7500000 1.00000000 0.75000000 1.00000000 0.50000000
## 140 1.0000000 0.66666667 0.66666667 0.66666667 0.33333333
## 141 0.5000000 0.62500000 0.62500000 0.62500000 0.62500000
## 142 0.7500000 0.87500000 0.50000000 0.62500000 0.62500000
## 143 0.2500000 0.50000000 0.75000000 1.00000000 0.75000000
## 144 0.5000000 0.80000000 0.80000000 0.80000000 0.70000000
## 145 0.8000000 0.40000000 0.60000000 0.20000000 0.40000000
## 146 1.0000000 0.60000000 1.00000000 0.40000000 0.60000000
## 147 0.5000000 0.75000000 1.00000000 0.25000000 0.75000000
## 148 0.7500000 0.75000000 0.87500000 0.62500000 0.75000000
## 149 0.6000000 0.80000000 1.00000000 0.90000000 0.70000000
## 150 0.5000000 0.50000000 0.50000000 0.00000000 0.50000000
## 151 0.5000000 0.66666667 0.50000000 0.16666667 1.00000000
## 152 0.5000000 0.75000000 0.75000000 0.75000000 0.00000000
## 153 0.6666667 0.66666667 0.33333333 0.66666667 0.66666667
## 154 1.0000000 0.66666667 1.00000000 0.33333333 1.00000000
## 155 0.6000000 0.80000000 0.60000000 0.60000000 0.80000000
## 156       NaN        NaN        NaN        NaN        NaN
## 157       NaN        NaN        NaN        NaN        NaN
## 158 0.6666667 0.77777778 0.55555556 0.77777778 0.66666667
## 159 0.5555556 0.55555556 0.77777778 0.88888889 0.66666667
## 160 1.0000000 1.00000000 0.66666667 1.00000000 0.33333333
## 161 0.5000000 1.00000000 0.50000000 0.25000000 0.50000000
## 162 0.4000000 0.60000000 0.60000000 0.80000000 0.60000000
## 163 0.8000000 0.80000000 0.60000000 0.80000000 0.40000000
## 164 0.2500000 0.75000000 0.25000000 0.75000000 0.50000000
## 165 0.7500000 0.25000000 0.25000000 1.00000000 0.50000000
## 166 1.0000000 0.00000000 1.00000000 0.50000000 0.50000000
## 167 0.5714286 0.57142857 0.85714286 0.57142857 0.85714286
## 168 0.5000000 1.00000000 1.00000000 0.50000000 0.50000000
## 169 1.0000000 0.00000000 1.00000000 1.00000000 1.00000000
## 170 0.5714286 0.85714286 0.71428571 0.71428571 0.71428571
## 171 0.5000000 1.00000000 0.75000000 1.00000000 0.50000000
## 172 0.6000000 0.60000000 0.80000000 0.60000000 0.60000000
## 173 0.8000000 0.60000000 0.70000000 0.60000000 0.60000000
## 174 1.0000000 0.50000000 0.50000000 0.50000000 0.50000000
## 175 0.7500000 0.50000000 0.50000000 0.50000000 0.37500000
## 176 0.6666667 0.83333333 0.50000000 0.33333333 0.50000000
## 177 0.3333333 0.66666667 0.66666667 1.00000000 0.33333333
## 178 0.8888889 0.77777778 0.66666667 1.00000000 0.77777778
## 179 0.6250000 0.87500000 0.50000000 0.62500000 0.50000000
## 180 0.3333333 0.33333333 0.33333333 0.33333333 0.33333333
## 181       NaN        NaN        NaN        NaN        NaN
## 182 1.0000000 0.83333333 0.83333333 0.83333333 0.66666667
## 183 0.6000000 0.80000000 0.80000000 1.00000000 0.60000000
## 184 0.6000000 0.40000000 0.80000000 0.60000000 0.80000000
## 185 0.6000000 0.80000000 1.00000000 0.60000000 0.60000000
## 186 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 187 0.8000000 0.60000000 0.60000000 0.60000000 1.00000000
## 188 0.6666667 0.33333333 0.66666667 0.66666667 0.33333333
## 189 0.8000000 0.60000000 1.00000000 0.80000000 0.80000000
## 190 0.7500000 0.75000000 0.75000000 0.87500000 0.75000000
## 191 0.6000000 0.80000000 0.60000000 0.60000000 0.60000000
## 192 0.6666667 1.00000000 0.66666667 0.00000000 0.66666667
## 193 1.0000000 0.00000000 0.00000000 1.00000000 1.00000000
## 194 0.8333333 0.83333333 0.83333333 1.00000000 0.83333333
## 195 0.4285714 0.28571429 0.71428571 0.42857143 0.85714286
## 196 0.0000000 1.00000000 1.00000000 1.00000000 1.00000000
```

```
## 197 0.5000000 0.12500000 0.50000000 0.62500000 0.87500000
## 198 0.5000000 0.50000000 1.00000000 1.00000000 0.50000000
## 199 1.0000000 1.00000000 1.00000000 0.50000000 0.50000000
## 200 0.5000000 1.00000000 0.50000000 0.50000000 0.00000000
## 201 0.0000000 1.00000000 1.00000000 0.50000000 0.50000000
## 202 0.5000000 0.50000000 0.37500000 0.50000000 0.50000000
## 203 0.7500000 0.50000000 0.75000000 0.75000000 1.00000000
## 204 0.5000000 0.50000000 0.75000000 0.50000000 0.75000000
## 205 0.6666667 0.66666667 0.66666667 0.66666667 0.66666667
## 206 0.5000000 1.00000000 1.00000000 1.00000000 0.50000000
## 207 0.5000000 0.50000000 1.00000000 0.50000000 0.83333333
## 208 0.2000000 1.00000000 0.60000000 0.60000000 0.80000000
## 209 0.8333333 1.00000000 0.66666667 0.66666667 0.66666667
## 210 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 211 0.5000000 0.50000000 0.50000000 0.50000000 0.00000000
## 212 0.5000000 0.75000000 0.75000000 0.50000000 0.50000000
## 213 1.0000000 1.00000000 0.80000000 0.80000000 0.60000000
## 214 0.6666667 0.33333333 0.00000000 0.33333333 0.33333333
## 215 0.6000000 0.60000000 0.80000000 1.00000000 0.60000000
## 216 1.0000000 0.75000000 0.25000000 0.25000000 0.75000000
## 217 0.7500000 0.25000000 0.75000000 1.00000000 0.50000000
## 218 0.4000000 0.40000000 0.40000000 0.20000000 0.40000000
## 219 0.8000000 0.40000000 0.40000000 0.60000000 0.60000000
## 220 0.4000000 0.60000000 0.80000000 0.80000000 0.20000000
## 221 0.6666667 0.66666667 0.66666667 0.00000000 0.33333333
## 222 0.6666667 0.00000000 0.33333333 0.66666667 0.00000000
## 223 1.0000000 1.00000000 1.00000000 0.00000000 1.00000000
## 224 1.0000000 0.25000000 0.50000000 1.00000000 0.75000000
## 225 0.2500000 0.50000000 0.50000000 0.75000000 0.75000000
## 226 0.3333333 0.33333333 0.16666667 0.66666667 0.33333333
## 227 0.8333333 0.50000000 0.83333333 0.50000000 0.50000000
## 228 1.0000000 1.00000000 1.00000000 0.00000000 0.00000000
## 229 1.0000000 1.00000000 0.00000000 1.00000000 0.00000000
## 230 0.7500000 0.75000000 0.50000000 0.75000000 0.75000000
## 231 0.8000000 1.00000000 1.00000000 0.80000000 0.80000000
## 232 0.4000000 0.60000000 0.40000000 0.40000000 0.40000000
## 233 0.7500000 0.50000000 0.75000000 0.50000000 0.75000000
## 234 0.6666667 0.66666667 0.66666667 1.00000000 0.66666667
## 235 0.0000000 1.00000000 1.00000000 1.00000000 1.00000000
## 236 0.6666667 0.66666667 0.33333333 0.66666667 0.33333333
## 237 1.0000000 0.50000000 1.00000000 0.50000000 1.00000000
## 238 1.0000000 1.00000000 1.00000000 1.00000000 1.00000000
## 239 0.6666667 1.00000000 1.00000000 1.00000000 0.66666667
## 240 0.5000000 1.00000000 0.50000000 0.50000000 0.00000000
## 241 1.0000000 0.00000000 0.00000000 1.00000000 1.00000000
## 242 1.0000000 1.00000000 1.00000000 1.00000000 0.00000000
## 243 0.6666667 0.66666667 0.33333333 1.00000000 0.66666667
## 244 0.3333333 0.00000000 0.33333333 1.00000000 1.00000000
## 245       NaN        NaN        NaN        NaN        NaN
## 246 1.0000000 1.00000000 0.00000000 0.00000000 1.00000000
## 247 0.0000000 0.00000000 1.00000000 1.00000000 1.00000000
## 248 0.0000000 0.66666667 0.00000000 0.66666667 0.33333333
## 249 0.7500000 0.50000000 0.25000000 0.50000000 0.50000000
## 250 0.0000000 0.66666667 0.00000000 0.66666667 0.33333333
## 251 0.3333333 0.66666667 1.00000000 1.00000000 0.33333333
## 252       NaN        NaN        NaN        NaN        NaN
## 253 1.0000000 0.00000000 1.00000000 1.00000000 1.00000000
## 254 0.0000000 0.00000000 1.00000000 0.00000000 1.00000000
```

```
## 255 0.5000000 0.50000000 0.00000000 0.50000000 0.50000000
## 256 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 257 0.5000000 0.75000000 0.75000000 0.75000000 0.75000000
## 258 1.0000000 1.00000000 1.00000000 0.00000000 0.00000000
## 259 1.0000000 0.00000000 0.00000000 0.00000000 0.50000000
## 260 1.0000000 0.50000000 0.50000000 0.50000000 1.00000000
## 261 0.5000000 1.00000000 0.50000000 1.00000000 1.00000000
## 262       NaN        NaN        NaN        NaN        NaN
## 263       NaN        NaN        NaN        NaN        NaN
## 264 0.0000000 1.00000000 0.00000000 1.00000000 0.00000000
## 265 0.3333333 0.00000000 0.66666667 0.66666667 0.00000000
## 266 1.0000000 1.00000000 0.00000000 0.00000000 0.00000000
## 267 0.5000000 0.00000000 0.00000000 0.00000000 0.00000000
## 268 0.0000000 0.50000000 0.00000000 0.50000000 0.50000000
## 269 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 270 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 271 0.0000000 0.00000000 0.00000000 1.00000000 0.00000000
## 272 0.0000000 0.00000000 1.00000000 0.00000000 0.00000000
## 273 1.0000000 1.00000000 1.00000000 0.50000000 0.00000000
## 274 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 275 0.5000000 0.50000000 0.00000000 0.00000000 0.00000000
## 276 0.3333333 0.50000000 0.33333333 0.33333333 0.33333333
## 277 0.6250000 0.25000000 0.87500000 0.87500000 0.37500000
## 278 0.1428571 0.14285714 0.57142857 0.42857143 0.28571429
## 279 0.5714286 0.57142857 0.42857143 0.14285714 0.57142857
## 280 0.8181818 0.72727273 0.81818182 0.81818182 0.36363636
## 281 0.0000000 0.00000000 0.00000000 0.00000000 0.00000000
## 282 0.8571429 0.57142857 0.57142857 0.71428571 0.85714286
## 283 0.5000000 0.50000000 0.50000000 1.00000000 1.00000000
## 284 1.0000000 0.66666667 0.66666667 1.00000000 0.66666667
## 285 0.6666667 0.66666667 0.66666667 0.66666667 0.33333333
## 286 1.0000000 0.66666667 0.66666667 0.66666667 1.00000000
## 287 0.6000000 0.60000000 0.60000000 0.20000000 0.40000000
## 288 1.0000000 0.66666667 1.00000000 0.66666667 1.00000000
## 289 0.7500000 0.50000000 0.25000000 0.50000000 0.25000000
## 290 1.0000000 1.00000000 0.50000000 0.00000000 0.50000000
## 291 0.6666667 0.33333333 1.00000000 0.66666667 1.00000000
## 292 0.6666667 0.66666667 0.66666667 0.66666667 0.66666667
## 293 1.0000000 0.25000000 0.25000000 0.25000000 0.25000000
## 294 0.5000000 0.50000000 0.50000000 0.50000000 0.50000000
## 295 1.0000000 1.00000000 0.50000000 0.50000000 0.00000000
## 296 0.6666667 0.66666667 0.33333333 0.66666667 0.33333333
## 297 0.6666667 0.66666667 0.33333333 0.66666667 0.66666667
## 298 0.7000000 0.40000000 0.00000000 0.20000000 0.40000000
## 299 0.5000000 0.00000000 0.00000000 0.00000000 0.50000000
## 300 1.0000000 0.50000000 1.00000000 0.50000000 0.50000000
##
## $prediction.success
##        1    2    3    4    5
## 1   0.75 0.80 0.65 0.70 0.80
## 2   0.70 0.80 0.55 0.60 0.60
## 3   0.80 0.60 0.75 0.80 0.60
## 4   0.75 0.60 0.75 0.70 0.60
## 5   0.65 0.60 0.60 0.55 0.60
## 6   0.85 0.80 0.90 0.85 0.85
## 7   0.65 0.65 0.70 0.65 0.80
## 8   0.60 0.70 0.65 0.60 0.55
## 9   0.70 0.80 0.80 0.50 0.70
```

```
## 10  0.70 0.60 0.65 0.70 0.80
## 11  0.80 0.45 0.70 0.60 0.55
## 12  0.85 0.90 0.85 0.75 0.90
## 13  0.75 0.70 0.75 0.80 0.80
## 14  0.70 0.80 0.65 0.65 0.70
## 15  0.65 0.85 0.70 0.60 0.70
## 16  0.80 0.70 0.70 0.70 0.80
## 17  0.80 0.70 0.60 0.85 0.65
## 18  0.60 0.80 0.65 0.85 0.75
## 19  0.80 0.80 0.90 0.70 0.90
## 20  0.75 0.65 0.65 0.70 0.75
## 21  0.65 0.70 0.75 0.65 0.65
## 22  0.60 0.75 0.55 0.65 0.65
## 23  0.75 0.65 0.60 0.60 0.60
## 24  0.65 0.70 0.70 0.80 0.75
## 25  0.65 0.70 0.65 0.55 0.80
## 26  0.80 0.85 0.60 0.75 0.60
## 27  0.70 0.65 0.70 0.60 0.70
## 28  0.60 0.70 0.50 0.60 0.70
## 29  0.55 0.65 0.70 0.70 0.70
## 30  0.65 0.70 0.65 0.65 0.70
## 31  0.65 0.80 0.65 0.75 0.50
## 32  0.80 0.80 0.85 0.65 0.85
## 33  0.55 0.75 0.85 0.65 0.65
## 34  0.80 0.75 0.70 0.75 0.80
## 35  0.80 0.75 0.90 0.90 0.90
## 36  0.80 0.50 0.70 0.65 0.75
## 37  0.60 0.65 0.70 0.75 0.65
## 38  0.45 0.70 0.50 0.55 0.45
## 39  0.60 0.70 0.55 0.50 0.50
## 40  0.75 0.75 0.75 0.85 0.95
## 41  0.65 0.90 0.80 0.85 0.95
## 42  0.75 0.70 0.60 0.90 0.40
## 43  0.80 0.80 0.55 0.65 0.65
## 44  0.75 0.70 0.65 0.60 0.50
## 45  0.80 0.75 0.80 0.75 0.75
## 46  0.70 0.60 0.60 0.95 0.75
## 47  0.70 0.65 0.70 0.75 0.70
## 48  0.65 0.55 0.65 0.75 0.60
## 49  0.60 0.70 0.70 0.65 0.65
## 50  0.85 0.85 0.75 0.60 0.70
## 51  0.80 0.80 0.75 0.60 0.75
## 52  0.65 0.75 0.70 0.70 0.75
## 53  0.70 0.70 0.80 0.65 0.60
## 54  0.70 0.55 0.70 0.85 0.80
## 55  0.80 0.75 0.65 0.80 0.75
## 56  0.80 0.70 0.70 0.55 0.50
## 57  0.75 0.55 0.45 0.65 0.80
## 58  0.75 0.75 0.90 0.80 0.75
## 59  0.70 0.75 0.85 0.80 0.75
## 60  0.80 0.65 0.60 0.75 0.65
## 61  0.60 0.75 0.75 0.80 0.60
## 62  0.70 0.80 0.65 0.70 0.75
## 63  0.65 0.65 0.70 0.70 0.70
## 64  0.75 0.85 0.80 0.60 0.65
## 65  0.60 0.70 0.55 0.60 0.65
## 66  0.65 0.65 0.65 0.50 0.70
## 67  0.50 0.50 0.45 0.50 0.50
```

```
## 68  0.65 0.75 0.85 0.70 0.55
## 69  0.55 0.35 0.50 0.65 0.60
## 70  0.45 0.70 0.70 0.75 0.70
## 71  0.65 0.60 0.40 0.80 0.65
## 72  0.80 0.70 0.85 0.70 0.55
## 73  0.55 0.75 0.70 0.65 0.70
## 74  0.70 0.70 0.60 0.75 0.65
## 75  0.50 0.55 0.50 0.65 0.60
## 76  0.85 0.80 0.70 0.75 0.80
## 77  0.75 0.70 0.75 0.80 0.65
## 78  0.60 0.75 0.45 0.55 0.80
## 79  0.70 0.65 0.65 0.55 0.85
## 80  0.70 0.60 0.55 0.50 0.55
## 81  0.70 0.55 0.70 0.80 0.50
## 82  0.50 0.80 0.55 0.40 0.65
## 83  0.60 0.55 0.75 0.65 0.80
## 84  0.70 0.70 0.65 0.85 0.60
## 85  0.70 0.55 0.75 0.55 0.75
## 86  0.60 0.55 0.70 0.60 0.55
## 87  0.50 0.60 0.65 0.75 0.60
## 88  0.70 0.55 0.70 0.70 0.70
## 89  0.65 0.70 0.65 0.55 0.60
## 90  0.75 0.60 0.65 0.45 0.45
## 91  0.50 0.50 0.55 0.70 0.65
## 92  0.45 0.70 0.65 0.75 0.50
## 93  0.70 0.55 0.80 0.70 0.65
## 94  0.70 0.55 0.50 0.65 0.75
## 95  0.50 0.55 0.65 0.80 0.60
## 96  0.60 0.75 0.60 0.70 0.65
## 97  0.65 0.70 0.60 0.60 0.75
## 98  0.40 0.75 0.55 0.55 0.80
## 99  0.40 0.55 0.60 0.45 0.45
## 100 0.65 0.55 0.65 0.60 0.60
## 101 0.80 0.85 0.60 0.60 0.50
## 102 0.80 0.65 0.65 0.80 0.70
## 103 0.75 0.70 0.50 0.70 0.55
## 104 0.55 0.55 0.55 0.55 0.75
## 105 0.65 0.80 0.65 0.65 0.65
## 106 0.70 0.75 0.75 0.50 0.55
## 107 0.70 0.60 0.55 0.60 0.60
## 108 0.75 0.65 0.60 0.60 0.55
## 109 0.55 0.50 0.60 0.60 0.60
## 110 0.75 0.45 0.55 0.40 0.65
## 111 0.55 0.65 0.60 0.65 0.70
## 112 0.40 0.50 0.60 0.60 0.65
## 113 0.55 0.60 0.60 0.55 0.60
## 114 0.60 0.60 0.55 0.60 0.75
## 115 0.70 0.65 0.45 0.70 0.70
## 116 0.75 0.65 0.70 0.65 0.80
## 117 0.55 0.55 0.55 0.65 0.50
## 118 0.55 0.55 0.45 0.60 0.60
## 119 0.80 0.70 0.65 0.75 0.75
## 120 0.65 0.75 0.55 0.55 0.70
## 121 0.55 0.65 0.45 0.70 0.65
## 122 0.75 0.50 0.70 0.60 0.60
## 123 0.45 0.50 0.55 0.55 0.55
## 124 0.75 0.75 0.70 0.70 0.60
## 125 0.75 0.75 0.70 0.70 0.75
```

```
## 126 0.45 0.70 0.75 0.60 0.55
## 127 0.65 0.60 0.50 0.60 0.55
## 128 0.60 0.60 0.70 0.75 0.60
## 129 0.55 0.65 0.60 0.60 0.60
## 130 0.75 0.75 0.70 0.75 0.60
## 131 0.50 0.60 0.50 0.60 0.60
## 132 0.60 0.50 0.65 0.60 0.45
## 133 0.75 0.60 0.70 0.90 0.65
## 134 0.70 0.70 0.55 0.65 0.60
## 135 0.45 0.40 0.45 0.65 0.40
## 136 0.65 0.55 0.60 0.60 0.55
## 137 0.60 0.55 0.75 0.55 0.60
## 138 0.65 0.60 0.60 0.60 0.70
## 139 0.60 0.50 0.60 0.50 0.70
## 140 0.65 0.70 0.80 0.80 0.75
## 141 0.70 0.70 0.70 0.75 0.70
## 142 0.70 0.55 0.70 0.65 0.75
## 143 0.70 0.65 0.65 0.60 0.70
## 144 0.75 0.55 0.60 0.50 0.65
## 145 0.60 0.50 0.60 0.80 0.75
## 146 0.50 0.65 0.45 0.80 0.60
## 147 0.60 0.75 0.55 0.70 0.60
## 148 0.55 0.65 0.55 0.60 0.55
## 149 0.70 0.55 0.30 0.50 0.50
## 150 0.85 0.80 0.80 0.70 0.80
## 151 0.75 0.70 0.75 0.75 0.50
## 152 0.75 0.70 0.85 0.60 0.85
## 153 0.60 0.60 0.85 0.60 0.55
## 154 0.75 0.70 0.55 0.85 0.55
## 155 0.70 0.75 0.65 0.75 0.70
## 156 0.90 0.75 0.85 0.55 0.95
## 157 0.85 0.80 0.80 0.70 0.85
## 158 0.60 0.50 0.65 0.55 0.50
## 159 0.65 0.60 0.55 0.55 0.65
## 160 0.65 0.65 0.85 0.80 0.85
## 161 0.80 0.60 0.85 0.75 0.65
## 162 0.85 0.75 0.65 0.70 0.75
## 163 0.70 0.80 0.75 0.75 0.80
## 164 0.70 0.60 0.75 0.75 0.60
## 165 0.75 0.90 0.90 0.75 0.80
## 166 0.70 0.65 0.85 0.75 0.60
## 167 0.70 0.65 0.60 0.70 0.55
## 168 0.70 0.55 0.80 0.70 0.80
## 169 0.80 0.80 0.75 0.90 0.85
## 170 0.75 0.65 0.65 0.65 0.75
## 171 0.70 0.40 0.70 0.65 0.80
## 172 0.70 0.60 0.55 0.70 0.70
## 173 0.60 0.65 0.50 0.60 0.55
## 174 0.75 0.75 0.70 0.65 0.70
## 175 0.45 0.50 0.70 0.65 0.60
## 176 0.65 0.55 0.80 0.80 0.70
## 177 0.70 0.70 0.80 0.75 0.85
## 178 0.60 0.45 0.50 0.45 0.40
## 179 0.65 0.50 0.70 0.65 0.70
## 180 0.70 0.85 0.70 0.70 0.80
## 181 0.75 0.60 0.90 0.75 0.80
## 182 0.50 0.50 0.70 0.65 0.80
## 183 0.85 0.80 0.75 0.65 0.75
```

```
## 184 0.70 0.85 0.75 0.70 0.60
## 185 0.70 0.70 0.50 0.75 0.75
## 186 0.90 0.75 0.70 0.80 0.75
## 187 0.75 0.75 0.75 0.65 0.50
## 188 0.75 0.85 0.65 0.75 0.85
## 189 0.65 0.80 0.70 0.75 0.65
## 190 0.60 0.55 0.65 0.50 0.55
## 191 0.65 0.65 0.70 0.80 0.70
## 192 0.75 0.60 0.55 0.90 0.80
## 193 0.85 0.90 0.70 0.85 0.90
## 194 0.70 0.75 0.70 0.55 0.70
## 195 0.80 0.85 0.55 0.80 0.55
## 196 0.80 0.70 0.65 0.85 0.70
## 197 0.70 0.90 0.70 0.75 0.60
## 198 0.95 0.85 0.75 0.85 0.85
## 199 0.65 0.70 0.70 0.85 0.85
## 200 0.70 0.75 0.80 0.85 0.85
## 201 0.90 0.80 0.75 0.85 0.80
## 202 0.75 0.80 0.85 0.75 0.75
## 203 0.60 0.65 0.60 0.55 0.70
## 204 0.75 0.80 0.70 0.85 0.70
## 205 0.90 0.85 0.80 0.80 0.85
## 206 0.75 0.75 0.85 0.65 0.65
## 207 0.70 0.75 0.65 0.85 0.75
## 208 0.85 0.65 0.80 0.85 0.75
## 209 0.55 0.60 0.80 0.70 0.75
## 210 0.70 0.75 0.90 0.85 0.95
## 211 0.90 0.85 0.90 0.80 0.85
## 212 0.80 0.80 0.75 0.80 0.80
## 213 0.65 0.70 0.75 0.75 0.85
## 214 0.75 0.80 0.85 0.85 0.85
## 215 0.65 0.75 0.70 0.70 0.75
## 216 0.70 0.65 0.70 0.75 0.85
## 217 0.65 0.65 0.70 0.65 0.75
## 218 0.80 0.85 0.85 0.80 0.80
## 219 0.75 0.70 0.80 0.80 0.70
## 220 0.75 0.70 0.80 0.70 0.85
## 221 0.85 0.90 0.85 0.75 0.85
## 222 0.70 0.85 0.95 0.90 0.75
## 223 0.85 0.95 0.85 0.90 0.90
## 224 0.75 0.90 0.70 0.70 0.70
## 225 0.90 0.80 0.85 0.85 0.75
## 226 0.80 0.80 0.95 0.75 0.90
## 227 0.60 0.80 0.70 0.85 0.65
## 228 0.85 0.65 0.85 0.95 0.75
## 229 0.75 0.80 0.85 0.80 0.85
## 230 0.75 0.75 0.80 0.85 0.80
## 231 0.80 0.75 0.75 0.80 0.80
## 232 0.80 0.75 0.90 0.75 0.90
## 233 0.80 0.80 0.65 0.80 0.80
## 234 0.80 0.65 0.75 0.70 0.85
## 235 0.85 0.80 0.80 0.80 0.75
## 236 0.85 0.85 0.70 0.70 0.75
## 237 0.75 0.85 0.75 0.75 0.60
## 238 0.65 0.80 0.75 0.80 0.60
## 239 0.75 0.70 0.70 0.70 0.75
## 240 0.85 0.70 0.80 0.75 0.85
## 241 0.65 0.80 0.75 0.65 0.70
```

```
## 242 0.80 0.80 0.75 0.90 0.90
## 243 0.80 0.80 0.95 0.85 0.80
## 244 0.90 0.80 0.95 0.80 0.85
## 245 0.90 0.75 0.85 0.90 0.90
## 246 0.95 0.80 0.85 0.80 0.80
## 247 0.80 0.80 0.85 0.85 0.90
## 248 0.80 0.85 0.85 0.85 0.85
## 249 0.75 0.85 0.90 0.90 0.80
## 250 0.95 0.90 0.95 0.80 0.90
## 251 0.85 0.85 0.75 0.65 0.85
## 252 0.95 0.80 0.95 0.90 0.95
## 253 0.75 0.85 0.90 0.85 0.80
## 254 0.95 0.95 0.80 0.90 0.85
## 255 0.85 0.85 0.90 0.90 0.90
## 256 0.85 0.90 0.95 0.95 0.85
## 257 0.85 0.70 0.70 0.75 0.70
## 258 0.85 0.85 0.75 0.85 0.85
## 259 0.75 0.80 0.80 0.80 0.85
## 260 0.80 0.90 0.90 0.70 0.80
## 261 0.80 0.70 0.85 0.65 0.75
## 262 0.85 0.85 0.90 0.85 0.95
## 263 0.90 0.85 0.90 0.95 0.80
## 264 0.90 0.85 0.70 0.85 0.75
## 265 0.80 0.90 0.85 0.85 0.95
## 266 0.80 0.90 0.80 0.85 0.95
## 267 0.95 0.95 0.95 0.90 0.85
## 268 0.85 0.80 1.00 0.90 0.90
## 269 0.95 0.80 0.95 0.85 0.95
## 270 0.85 0.90 0.95 0.85 0.90
## 271 0.85 0.90 0.75 0.75 0.80
## 272 0.85 0.80 0.95 0.85 0.75
## 273 0.80 0.85 0.70 0.75 0.90
## 274 0.90 0.85 0.95 0.90 0.95
## 275 0.90 0.70 0.90 0.85 0.85
## 276 0.65 0.55 0.50 0.60 0.65
## 277 0.60 0.80 0.50 0.50 0.75
## 278 0.75 0.70 0.40 0.55 0.65
## 279 0.60 0.70 0.75 0.80 0.65
## 280 0.50 0.45 0.55 0.55 0.70
## 281 0.80 0.95 0.90 0.95 0.85
## 282 0.55 0.75 0.65 0.60 0.50
## 283 0.80 0.80 0.80 0.85 0.90
## 284 0.55 0.70 0.65 0.50 0.60
## 285 0.75 0.80 0.65 0.80 0.75
## 286 0.70 0.85 0.85 0.75 0.70
## 287 0.80 0.80 0.80 0.85 0.80
## 288 0.75 0.85 0.75 0.80 0.85
## 289 0.85 0.85 0.80 0.80 0.95
## 290 0.85 0.65 0.70 0.85 0.75
## 291 0.80 0.80 0.80 0.85 0.75
## 292 0.90 0.75 0.75 0.85 0.85
## 293 0.65 0.75 0.85 0.80 0.85
## 294 0.70 0.85 0.85 0.85 0.80
## 295 0.65 0.80 0.75 0.90 1.00
## 296 0.75 0.90 0.90 0.70 0.80
## 297 0.85 0.80 0.80 0.75 0.65
## 298 0.50 0.55 0.85 0.80 0.70
## 299 0.90 0.95 0.90 0.95 0.90
```

```
## 300 0.80 0.85 0.80 0.90 0.90
##
## $sensitivity
##             1         2         3         4         5
## 1   0.2500000 0.0000000 0.0000000 0.2000000 0.3333333
## 2   0.4000000 0.5000000 0.2727273 0.3333333 0.3000000
## 3   0.5555556 0.3846154 0.5000000 0.5555556 0.3333333
## 4   0.5000000 0.3333333 0.5000000 0.4444444 0.3636364
## 5   0.2222222 0.2000000 0.2000000 0.1818182 0.2000000
## 6   0.8888889 0.8000000 1.0000000 0.8888889 0.7692308
## 7   0.3750000 0.4000000 0.4444444 0.4000000 0.5555556
## 8   0.3636364 0.4545455 0.4000000 0.3636364 0.3571429
## 9   0.7500000 1.0000000 0.8750000 0.5000000 0.8333333
## 10  0.4545455 0.3333333 0.3750000 0.4545455 0.5714286
## 11  0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 12  0.9090909 0.9166667 0.8461538 0.7692308 1.0000000
## 13  0.6923077 0.7000000 0.7777778 0.8000000 0.7500000
## 14  0.5454545 0.6666667 0.5000000 0.5000000 0.5454545
## 15  0.6428571 0.9000000 0.7272727 0.6666667 0.7272727
## 16  0.7500000 0.6666667 0.7000000 0.6666667 0.7142857
## 17  0.6000000 0.5000000 0.4166667 0.7142857 0.4444444
## 18  0.4444444 0.6363636 0.5000000 0.7000000 0.6000000
## 19  1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 20  0.5833333 0.5000000 0.5000000 0.5454545 0.6000000
## 21  0.5454545 0.5833333 0.6363636 0.5384615 0.5454545
## 22  0.4666667 0.5833333 0.4166667 0.5000000 0.5000000
## 23  0.4285714 0.3333333 0.3333333 0.3333333 0.3000000
## 24  0.6666667 0.7500000 0.7500000 0.8750000 1.0000000
## 25  0.3333333 0.3333333 0.2857143 0.1428571 0.5000000
## 26  0.6666667 0.8000000 0.3750000 0.5714286 0.3333333
## 27  0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 28  0.4285714 0.5454545 0.3333333 0.4444444 0.5454545
## 29  0.4285714 0.6000000 0.6666667 0.6666667 0.6250000
## 30  0.4615385 0.5000000 0.4545455 0.4545455 0.5000000
## 31  0.6363636 0.8750000 0.6363636 0.6923077 0.5000000
## 32  0.8181818 0.7692308 0.9000000 0.7000000 1.0000000
## 33  0.3750000 0.6250000 0.7000000 0.5000000 0.5000000
## 34  0.6666667 0.6000000 0.5384615 0.6000000 0.6363636
## 35  0.8750000 0.7777778 0.8333333 1.0000000 0.9000000
## 36  0.6666667 0.4166667 0.5714286 0.5333333 0.6363636
## 37  0.7777778 0.8000000 0.8181818 0.9000000 0.8000000
## 38  0.3000000 0.5384615 0.3333333 0.4000000 0.3000000
## 39  0.6000000 0.7000000 0.5555556 0.5000000 0.5000000
## 40  0.7272727 0.7272727 0.7272727 0.8181818 0.9090909
## 41  0.8333333 1.0000000 1.0000000 0.9000000 1.0000000
## 42  1.0000000 0.8333333 0.6250000 0.9000000 0.3333333
## 43  0.7000000 0.7500000 0.4285714 0.5555556 0.5714286
## 44  0.7272727 0.8333333 0.7142857 0.6250000 0.5000000
## 45  0.8750000 0.7272727 0.8750000 0.7272727 0.8571429
## 46  0.6666667 0.5000000 0.5000000 0.8888889 0.6363636
## 47  0.5000000 0.4444444 0.5000000 0.6000000 0.5000000
## 48  0.5454545 0.4444444 0.5714286 1.0000000 0.5000000
## 49  0.5000000 0.6000000 0.6250000 0.5555556 0.6000000
## 50  1.0000000 0.9090909 1.0000000 0.7000000 0.8750000
## 51  0.8888889 0.8888889 0.8000000 0.7142857 1.0000000
## 52  0.4000000 0.5000000 0.4285714 0.4545455 0.5000000
## 53  0.7142857 0.6666667 0.7777778 0.6666667 0.5454545
## 54  0.8750000 0.7142857 1.0000000 0.9090909 0.8333333
```

```
## 55  0.5555556 0.5000000 0.4000000 0.5714286 0.5000000
## 56  0.5000000 0.4000000 0.3750000 0.2727273 0.1250000
## 57  0.6666667 0.5000000 0.3750000 0.5833333 0.8571429
## 58  0.6666667 0.6666667 0.8000000 0.7000000 0.6363636
## 59  0.7777778 0.7500000 0.8333333 0.7692308 0.8000000
## 60  0.6666667 0.4285714 0.4000000 0.5714286 0.4285714
## 61  0.6250000 0.7272727 0.7272727 0.7500000 0.6250000
## 62  0.7142857 0.8571429 0.6666667 0.6666667 0.6666667
## 63  0.6666667 0.7500000 0.7142857 0.8000000 0.7142857
## 64  0.5714286 0.7142857 0.7500000 0.3750000 0.4000000
## 65  0.6666667 0.8333333 0.6666667 0.7500000 0.6666667
## 66  0.8333333 0.8333333 0.8333333 0.6000000 1.0000000
## 67  0.5714286 0.5555556 0.5000000 0.5555556 0.5714286
## 68  1.0000000 0.8000000 1.0000000 0.7777778 0.6250000
## 69  0.5000000 0.1666667 0.4285714 0.6666667 0.5714286
## 70  0.6000000 0.8750000 1.0000000 0.8888889 0.8750000
## 71  0.4545455 0.4000000 0.2000000 0.6250000 0.4285714
## 72  0.8000000 0.6666667 0.8888889 0.8333333 0.5714286
## 73  0.6000000 0.7500000 0.7777778 0.7500000 0.7272727
## 74  0.6666667 0.6666667 0.5555556 0.8333333 0.6666667
## 75  0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 76  1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 77  0.7692308 0.7500000 0.8888889 0.9000000 0.7777778
## 78  0.7142857 0.8750000 0.5000000 0.7500000 0.8888889
## 79  0.1666667 0.1428571 0.1428571 0.1111111 0.4000000
## 80  0.5714286 0.4285714 0.3750000 0.3333333 0.3750000
## 81  1.0000000 0.7142857 0.8000000 1.0000000 0.6250000
## 82  0.3333333 1.0000000 0.4444444 0.1666667 0.6000000
## 83  0.7500000 0.8000000 0.8888889 1.0000000 1.0000000
## 84  0.0000000 0.0000000 0.1428571 0.0000000 0.0000000
## 85  0.2857143 0.1250000 0.3333333 0.0000000 0.3333333
## 86  1.0000000 0.6666667 1.0000000 0.7500000 0.5714286
## 87  0.5555556 0.8000000 0.7500000 0.8750000 0.6666667
## 88  0.7500000 0.6000000 0.7500000 0.7500000 0.7500000
## 89  0.6000000 0.7500000 0.6000000 0.4285714 0.5000000
## 90  1.0000000 0.5714286 0.7500000 0.0000000 0.3333333
## 91  0.5000000 0.5000000 0.6666667 1.0000000 0.7142857
## 92  0.5000000 0.7272727 0.7500000 1.0000000 0.5555556
## 93  0.8750000 0.7142857 0.9000000 0.8000000 0.7777778
## 94  0.5000000 0.3636364 0.3000000 0.4545455 0.5555556
## 95  0.6250000 0.6666667 0.7777778 0.9000000 0.8333333
## 96  0.7500000 1.0000000 1.0000000 1.0000000 0.7142857
## 97  0.5000000 0.5555556 0.4000000 0.4444444 0.6666667
## 98  0.2000000 0.8333333 0.5000000 0.5000000 0.7777778
## 99  0.4000000 0.7500000 0.8000000 0.5000000 0.5000000
## 100 0.6000000 0.4000000 0.6000000 0.5000000 0.5000000
## 101 0.8000000 0.7500000 0.4444444 0.4444444 0.2857143
## 102 0.8333333 0.6000000 0.6666667 0.8333333 1.0000000
## 103 0.6666667 0.6000000 0.3750000 0.6250000 0.4285714
## 104 0.6666667 1.0000000 0.8000000 0.6666667 0.8888889
## 105 0.5000000 0.8000000 0.5000000 0.5000000 0.5000000
## 106 0.6666667 1.0000000 0.7500000 0.0000000 0.0000000
## 107 0.5000000 0.0000000 0.2857143 0.3333333 0.3750000
## 108 0.8571429 0.8000000 0.7500000 0.6666667 0.5555556
## 109 0.5833333 0.5714286 0.8000000 0.6666667 0.8000000
## 110 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 111 0.4000000 0.5714286 0.5000000 0.5555556 0.6666667
## 112 0.3750000 0.5000000 1.0000000 0.7500000 0.8000000
```

```
## 113 0.4000000 0.5000000 0.5000000 0.4285714 0.5000000
## 114 0.1428571 0.0000000 0.2000000 0.1428571 0.3333333
## 115 0.6250000 0.5714286 0.2857143 0.6666667 0.6250000
## 116 0.0000000 0.1250000 0.1428571 0.0000000 0.0000000
## 117 0.7500000 0.6666667 1.0000000 0.8333333 0.6666667
## 118 0.8333333 0.7500000 0.6666667 0.8571429 1.0000000
## 119 0.3333333 0.2000000 0.2500000 0.2500000 0.2500000
## 120 0.1666667 0.2500000 0.0000000 0.1250000 0.0000000
## 121 0.3333333 0.3333333 0.2222222 0.5000000 0.4000000
## 122 1.0000000 0.6000000 0.8571429 0.6666667 0.6666667
## 123 0.2500000 0.3333333 0.5000000 0.5000000 0.5000000
## 124 1.0000000 0.6666667 0.5000000 0.5000000 0.2500000
## 125 0.0000000 0.0000000 0.1666667 0.0000000 0.2000000
## 126 0.2000000 0.6000000 0.7142857 0.5000000 0.3333333
## 127 1.0000000 1.0000000 0.6666667 0.8000000 0.7500000
## 128 0.7142857 0.7142857 1.0000000 0.8000000 0.8000000
## 129 0.6666667 0.8000000 1.0000000 0.7500000 0.7500000
## 130 0.7777778 1.0000000 0.7500000 0.8571429 0.6250000
## 131 0.5000000 0.7500000 0.5000000 0.6666667 0.6250000
## 132 0.6250000 0.5000000 1.0000000 0.7500000 0.4000000
## 133 0.5000000 0.2000000 0.3333333 1.0000000 0.3750000
## 134 0.4285714 0.4285714 0.2500000 0.3333333 0.3333333
## 135 0.5000000 0.4285714 0.5000000 0.7500000 0.3333333
## 136 0.6000000 0.4444444 0.5000000 0.5000000 0.4000000
## 137 0.6000000 0.5000000 0.7500000 0.5000000 0.6000000
## 138 0.5000000 0.4000000 0.4000000 0.4285714 0.6000000
## 139 0.1666667 0.0000000 0.1666667 0.0000000 0.3333333
## 140 0.0000000 0.2000000 0.3333333 0.3333333 0.3333333
## 141 0.6666667 0.7500000 0.7500000 1.0000000 0.7500000
## 142 1.0000000 0.3333333 0.6666667 0.6000000 1.0000000
## 143 0.3750000 0.2857143 0.2000000 0.0000000 0.2500000
## 144 1.0000000 0.6666667 1.0000000 0.5000000 1.0000000
## 145 0.2000000 0.2727273 0.2857143 0.5714286 0.5000000
## 146 0.0000000 0.3333333 0.0000000 0.6000000 0.2857143
## 147 0.2500000 0.3333333 0.0000000 0.3750000 0.1666667
## 148 0.4000000 0.6666667 0.3333333 0.5000000 0.4000000
## 149 1.0000000 0.6666667 0.0000000 0.5000000 0.5000000
## 150 0.3333333 0.2500000 0.2500000 0.2500000 0.2500000
## 151 0.6000000 0.5000000 0.6000000 0.5555556 0.0000000
## 152 0.4000000 0.2500000 1.0000000 0.1666667 0.5714286
## 153 0.6000000 0.6000000 1.0000000 0.6000000 0.5000000
## 154 0.0000000 0.2000000 0.0000000 0.5000000 0.0000000
## 155 0.4000000 0.5000000 0.3333333 0.5000000 0.3333333
## 156 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 157 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 158 0.6000000 0.4000000 0.6666667 0.5000000 0.4285714
## 159 0.6666667 0.5714286 0.5000000 0.5000000 0.7500000
## 160 0.0000000 0.0000000 0.5000000 0.0000000 0.5000000
## 161 0.5000000 0.0000000 0.6666667 0.4285714 0.2857143
## 162 0.7500000 0.5000000 0.3333333 0.3333333 0.5000000
## 163 0.3333333 1.0000000 0.5000000 0.5000000 0.6000000
## 164 0.3750000 0.1666667 0.4285714 0.3333333 0.2500000
## 165 0.3333333 0.7500000 0.7500000 0.0000000 0.5000000
## 166 0.0000000 0.2222222 0.0000000 0.2000000 0.1250000
## 167 0.6000000 0.5000000 0.3333333 0.6000000 0.2500000
## 168 0.1666667 0.0000000 0.0000000 0.1666667 0.2500000
## 169 0.0000000 0.2000000 0.0000000 0.0000000 0.0000000
## 170 0.7500000 0.5000000 0.5000000 0.5000000 1.0000000
```

```
## 171 0.3333333 0.0000000 0.2500000 0.0000000 0.5000000
## 172 0.4000000 0.2857143 0.1666667 0.4000000 0.4000000
## 173 1.0000000 0.8000000 0.5000000 0.6666667 0.5714286
## 174 0.0000000 0.2000000 0.1666667 0.1428571 0.1666667
## 175 0.2857143 0.4000000 0.6666667 0.5714286 0.5000000
## 176 0.4000000 0.2000000 0.7500000 0.6666667 0.5000000
## 177 0.2857143 0.2000000 0.3333333 0.0000000 0.5000000
## 178 1.0000000 0.3333333 0.4285714 0.0000000 0.2857143
## 179 0.6000000 0.2500000 0.6666667 0.6000000 0.6666667
## 180 0.2857143 0.5000000 0.2857143 0.2857143 0.4000000
## 181 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 182 0.0000000 0.1666667 0.5000000 0.3333333 1.0000000
## 183 1.0000000 1.0000000 0.5000000 0.0000000 0.5000000
## 184 0.4000000 0.7500000 0.5000000 0.4000000 0.2000000
## 185 0.4000000 0.3333333 0.0000000 0.5000000 0.5000000
## 186 0.3333333 0.1666667 0.1428571 0.2000000 0.1666667
## 187 0.5000000 0.5000000 0.5000000 0.3333333 0.0000000
## 188 0.2500000 0.5000000 0.1666667 0.2500000 0.5000000
## 189 0.2500000 0.6666667 0.0000000 0.5000000 0.2500000
## 190 0.5000000 0.4000000 0.6666667 0.2500000 0.4000000
## 191 0.3333333 0.2500000 0.4000000 0.6666667 0.4000000
## 192 0.2500000 0.0000000 0.1250000 0.6000000 0.3333333
## 193 0.0000000 0.3333333 0.1428571 0.0000000 0.0000000
## 194 0.5000000 1.0000000 0.5000000 0.0000000 0.5000000
## 195 0.8000000 0.8333333 0.3333333 0.8000000 0.2500000
## 196 0.2000000 0.0000000 0.0000000 0.0000000 0.0000000
## 197 0.6666667 0.8750000 0.6666667 1.0000000 0.5000000
## 198 1.0000000 0.3333333 0.0000000 0.0000000 0.3333333
## 199 0.0000000 0.0000000 0.0000000 0.3333333 0.3333333
## 200 0.1666667 0.0000000 0.2500000 0.3333333 0.4000000
## 201 0.5000000 0.0000000 0.0000000 0.3333333 0.2500000
## 202 0.8000000 1.0000000 1.0000000 0.8000000 0.8000000
## 203 0.1666667 0.2857143 0.1666667 0.1428571 0.0000000
## 204 0.4000000 0.5000000 0.2500000 0.6666667 0.2500000
## 205 1.0000000 0.5000000 0.3333333 0.3333333 0.5000000
## 206 0.2000000 0.0000000 0.0000000 0.0000000 0.1428571
## 207 0.5000000 0.6000000 0.0000000 1.0000000 1.0000000
## 208 0.6666667 0.0000000 0.6666667 1.0000000 0.5000000
## 209 0.2000000 0.0000000 1.0000000 0.5000000 0.6666667
## 210 0.1428571 0.1666667 0.3333333 0.2500000 0.5000000
## 211 0.5000000 0.3333333 0.5000000 0.2500000 0.4000000
## 212 0.5000000 0.5000000 0.3333333 0.5000000 0.5000000
## 213 0.0000000 0.0000000 0.5000000 0.5000000 1.0000000
## 214 0.2500000 0.4000000 0.5000000 0.5000000 0.5000000
## 215 0.3333333 0.5000000 0.3333333 0.0000000 0.5000000
## 216 0.0000000 0.2000000 0.3750000 0.4285714 1.0000000
## 217 0.2000000 0.3333333 0.2500000 0.0000000 0.4000000
## 218 0.6000000 0.7500000 0.7500000 0.5714286 0.6000000
## 219 0.5000000 0.4285714 0.6000000 0.6666667 0.4000000
## 220 0.5000000 0.4000000 1.0000000 0.3333333 0.6666667
## 221 0.5000000 1.0000000 0.5000000 0.3750000 0.5000000
## 222 0.2000000 0.5000000 1.0000000 1.0000000 0.3750000
## 223 0.0000000       NaN 0.0000000 0.3333333 0.0000000
## 224 0.0000000 0.7500000 0.3333333 0.0000000 0.2500000
## 225 0.7500000 0.5000000 0.6666667 1.0000000 0.3333333
## 226 0.6666667 0.6666667 1.0000000 0.6666667 1.0000000
## 227 0.2500000 0.7500000 0.5000000 1.0000000 0.4285714
## 228 0.0000000 0.0000000 0.0000000 0.5000000 0.1666667
```

```
## 229 0.0000000 0.0000000 0.2500000 0.0000000 0.2500000
## 230 0.3333333 0.3333333 0.5000000 1.0000000 0.5000000
## 231 1.0000000       NaN       NaN 1.0000000 1.0000000
## 232 0.6000000 0.5000000 1.0000000 0.5000000 1.0000000
## 233 0.5000000 0.5000000 0.2000000 0.5000000 0.5000000
## 234 0.3333333 0.1666667 0.2500000 0.0000000 0.5000000
## 235 0.2500000 0.0000000 0.0000000 0.0000000 0.0000000
## 236 0.5000000 0.5000000 0.2857143 0.2000000 0.3333333
## 237 0.0000000 0.3333333 0.0000000 0.2000000 0.0000000
## 238 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 239 0.2500000 0.0000000 0.0000000 0.0000000 0.2500000
## 240 0.3333333 0.0000000 0.2500000 0.2000000 0.4000000
## 241 0.0000000 0.2000000 0.1666667 0.0000000 0.0000000
## 242 0.0000000 0.0000000 0.0000000 0.0000000 0.3333333
## 243 0.3333333 0.3333333 1.0000000       NaN 0.3333333
## 244 0.6666667 0.4285714 1.0000000 0.0000000       NaN
## 245 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 246       NaN 0.0000000 0.2500000 0.2000000 0.0000000
## 247 0.2000000 0.2000000 0.0000000 0.0000000 0.0000000
## 248 0.4285714 0.5000000 0.5000000 0.5000000 0.5000000
## 249 0.3333333 0.6666667 0.7500000 1.0000000 0.5000000
## 250 0.7500000 1.0000000 0.7500000 0.3333333 0.6666667
## 251 0.5000000 0.5000000 0.0000000 0.0000000 0.5000000
## 252 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 253 0.0000000 0.2500000 0.0000000 0.0000000 0.0000000
## 254 0.5000000 0.5000000 0.0000000 0.3333333 0.0000000
## 255 0.3333333 0.3333333 0.5000000 0.5000000 0.5000000
## 256 0.4000000 0.5000000 0.6666667 0.6666667 0.4000000
## 257 0.6666667 0.2500000 0.2500000 0.3333333 0.2500000
## 258 0.0000000 0.0000000 0.0000000 0.4000000 0.4000000
## 259 0.0000000 0.3333333 0.3333333 0.3333333 0.3333333
## 260 0.0000000 0.5000000 0.5000000 0.1666667 0.0000000
## 261 0.2500000 0.0000000 0.3333333 0.0000000 0.0000000
## 262 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 263 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 264 0.3333333 0.0000000 0.1428571 0.0000000 0.1666667
## 265 0.4000000 0.6000000 0.5000000 0.5000000 0.7500000
## 266 0.0000000 0.0000000 0.2000000 0.2500000 0.5000000
## 267 1.0000000 0.6666667 0.6666667 0.5000000 0.4000000
## 268 0.4000000 0.2500000 1.0000000 0.5000000 0.5000000
## 269 0.5000000 0.2000000 0.5000000 0.2500000 0.5000000
## 270 0.2500000 0.3333333 0.5000000 0.2500000 0.3333333
## 271 0.2500000 0.3333333 0.1666667 0.0000000 0.2000000
## 272 0.2500000 0.2000000       NaN 0.2500000 0.1666667
## 273 0.0000000 0.0000000 0.0000000 0.2000000 0.5000000
## 274 0.3333333 0.2500000 0.5000000 0.3333333 0.5000000
## 275 0.5000000 0.1666667 0.5000000 0.4000000 0.4000000
## 276 0.4444444 0.3333333 0.3333333 0.4000000 0.4444444
## 277 0.5000000 0.7500000 0.2500000 0.2500000 0.7142857
## 278 0.6000000 0.5454545 0.2727273 0.4000000 0.5000000
## 279 0.4285714 0.6000000 0.6666667 0.6666667 0.5000000
## 280 0.6666667 0.5000000 1.0000000 1.0000000 0.7777778
## 281 0.2000000 0.5000000 0.3333333 0.5000000 0.2500000
## 282 0.2500000 0.7500000 0.5000000 0.4000000 0.2000000
## 283 0.2500000 0.2500000 0.2500000 0.0000000       NaN
## 284 0.0000000 0.5000000 0.4000000 0.0000000 0.3333333
## 285 0.2500000 0.3333333 0.1666667 0.3333333 0.3333333
## 286 0.0000000 0.5000000 0.5000000 0.2500000 0.0000000
```

```
## 287 0.6666667 0.6666667 0.6666667 0.6666667 0.6000000
## 288 0.0000000 0.5000000 0.0000000 0.3333333       NaN
## 289 1.0000000 0.6666667 0.5000000 0.5000000 1.0000000
## 290 0.0000000 0.0000000 0.1666667 0.4000000 0.2000000
## 291 0.3333333 0.4000000 0.0000000 0.5000000 0.0000000
## 292 1.0000000 0.2500000 0.2500000 0.5000000 0.5000000
## 293 0.0000000 0.4285714 0.6000000 0.5000000 0.6000000
## 294 0.3333333 0.6666667 0.6666667 0.6666667 0.5000000
## 295 0.0000000       NaN 0.4000000 1.0000000 1.0000000
## 296 0.2500000 1.0000000 0.6666667 0.2000000 0.4000000
## 297 0.5000000 0.3333333 0.4000000 0.2500000 0.1666667
## 298 0.5000000 0.5454545 0.7692308 0.8000000 0.7500000
## 299 0.5000000 0.6666667 0.5000000 0.6666667 0.5000000
## 300 0.0000000 0.3333333 0.0000000 0.5000000 0.5000000
##
## $specificity
##             1         2         3         4         5
## 1   0.8750000 0.8421053 0.8125000 0.8666667 0.8823529
## 2   1.0000000 1.0000000 0.8888889 1.0000000 0.9000000
## 3   1.0000000 1.0000000 1.0000000 1.0000000 0.8181818
## 4   0.9166667 0.8181818 0.9166667 0.9090909 0.8888889
## 5   1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 6   0.8181818 0.8000000 0.8333333 0.8181818 1.0000000
## 7   0.8333333 0.9000000 0.9090909 0.9000000 1.0000000
## 8   0.8888889 1.0000000 0.9000000 0.8888889 1.0000000
## 9   0.6666667 0.7142857 0.7500000 0.5000000 0.6428571
## 10  1.0000000 0.8181818 0.8333333 1.0000000 0.9230769
## 11  1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 12  0.7777778 0.8750000 0.8571429 0.7142857 0.8000000
## 13  0.8571429 0.7000000 0.7272727 0.8000000 0.8750000
## 14  0.8888889 0.9090909 0.8000000 0.8750000 0.8888889
## 15  0.6666667 0.8000000 0.6666667 0.5454545 0.6666667
## 16  0.8750000 0.7500000 0.7000000 0.7500000 1.0000000
## 17  1.0000000 0.9000000 0.8750000 0.9230769 0.8181818
## 18  0.7272727 1.0000000 1.0000000 1.0000000 0.9000000
## 19  0.5555556 0.5555556 0.7142857 0.4545455 0.7142857
## 20  1.0000000 0.8000000 0.8750000 0.8888889 0.9000000
## 21  0.7777778 0.8750000 0.8888889 0.8571429 0.7777778
## 22  1.0000000 1.0000000 0.7500000 0.8750000 0.8750000
## 23  0.9230769 0.9090909 1.0000000 1.0000000 0.9000000
## 24  0.6363636 0.6666667 0.6666667 0.7500000 0.6666667
## 25  0.9090909 0.8571429 0.8461538 0.7692308 0.9285714
## 26  0.8571429 0.8666667 0.7500000 0.8461538 0.7142857
## 27  1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 28  0.6923077 0.8888889 0.6363636 0.7272727 0.8888889
## 29  0.6153846 0.6666667 0.7142857 0.7142857 0.7500000
## 30  1.0000000 1.0000000 0.8888889 0.8888889 0.9000000
## 31  0.6666667 0.7500000 0.6666667 0.8571429 0.5000000
## 32  0.7777778 0.8571429 0.8000000 0.6000000 0.7500000
## 33  0.6666667 0.8333333 1.0000000 0.8750000 0.7142857
## 34  0.9090909 0.9000000 1.0000000 0.9000000 1.0000000
## 35  0.7500000 0.7272727 1.0000000 0.8333333 0.9000000
## 36  1.0000000 0.6250000 1.0000000 1.0000000 0.8888889
## 37  0.4545455 0.5000000 0.5555556 0.6000000 0.5000000
## 38  0.6000000 1.0000000 0.6363636 0.7000000 0.6000000
## 39  0.6000000 0.7000000 0.5454545 0.5000000 0.5000000
## 40  0.7777778 0.7777778 0.7777778 0.8888889 1.0000000
## 41  0.5714286 0.8181818 0.6923077 0.8000000 0.9000000
```

```
## 42  0.6666667 0.6428571 0.5833333 0.9000000 0.4285714
## 43  0.9000000 0.8333333 0.6153846 0.7272727 0.6923077
## 44  0.7777778 0.6428571 0.6153846 0.5833333 0.5000000
## 45  0.7500000 0.7777778 0.7500000 0.7777778 0.6923077
## 46  0.7142857 0.6428571 0.6428571 1.0000000 0.8888889
## 47  0.8333333 0.8181818 0.8333333 0.8000000 0.8333333
## 48  0.7777778 0.6363636 0.6923077 0.7058824 0.7000000
## 49  0.6666667 0.8000000 0.7500000 0.7272727 0.6666667
## 50  0.7272727 0.7777778 0.6153846 0.5000000 0.5833333
## 51  0.7272727 0.7272727 0.7000000 0.5384615 0.6428571
## 52  0.9000000 1.0000000 0.8461538 1.0000000 0.9166667
## 53  0.6923077 0.7272727 0.8181818 0.6428571 0.6666667
## 54  0.5833333 0.4615385 0.5714286 0.7777778 0.7500000
## 55  1.0000000 0.8571429 0.9000000 0.9230769 0.9166667
## 56  1.0000000 1.0000000 0.9166667 0.8888889 0.7500000
## 57  0.8750000 0.6000000 0.5000000 0.7500000 0.7692308
## 58  0.8181818 0.8181818 1.0000000 0.9000000 0.8888889
## 59  0.6363636 0.7500000 0.8750000 0.8571429 0.7000000
## 60  0.8571429 0.7692308 0.8000000 0.8461538 0.7692308
## 61  0.5833333 0.7777778 0.7777778 0.8750000 0.5833333
## 62  0.6923077 0.7692308 0.6428571 0.7272727 0.8750000
## 63  0.6428571 0.6250000 0.6923077 0.6666667 0.6923077
## 64  0.8461538 0.9230769 0.8125000 0.7500000 0.7333333
## 65  0.5714286 0.6428571 0.5294118 0.5625000 0.6363636
## 66  0.5714286 0.5714286 0.5714286 0.4666667 0.6000000
## 67  0.4615385 0.4545455 0.4285714 0.4545455 0.4615385
## 68  0.5625000 0.7000000 0.7500000 0.6363636 0.5000000
## 69  0.5833333 0.4285714 0.5384615 0.6428571 0.6153846
## 70  0.4000000 0.5833333 0.5714286 0.6363636 0.5833333
## 71  0.8888889 0.8000000 0.6000000 0.9166667 0.7692308
## 72  0.8000000 0.7500000 0.8181818 0.6428571 0.5384615
## 73  0.5000000 0.7500000 0.6363636 0.5833333 0.6666667
## 74  0.7272727 0.7272727 0.6363636 0.7142857 0.6428571
## 75  1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 76  0.6666667 0.6000000 0.5000000 0.5454545 0.6000000
## 77  0.7142857 0.6250000 0.6363636 0.7000000 0.5454545
## 78  0.5384615 0.6666667 0.3750000 0.5000000 0.7272727
## 79  0.9285714 0.9230769 0.9230769 0.9090909 1.0000000
## 80  0.7692308 0.6923077 0.6666667 0.6363636 0.6666667
## 81  0.5714286 0.4615385 0.6000000 0.6666667 0.4166667
## 82  0.5714286 0.7500000 0.6363636 0.5000000 0.6666667
## 83  0.5000000 0.4666667 0.6363636 0.5333333 0.6666667
## 84  0.8750000 0.8750000 0.9230769 0.8947368 0.8571429
## 85  0.9230769 0.8333333 0.9285714 0.7857143 0.9285714
## 86  0.5555556 0.5294118 0.6250000 0.5625000 0.5384615
## 87  0.4545455 0.5333333 0.5833333 0.6666667 0.5454545
## 88  0.6666667 0.5333333 0.6666667 0.6666667 0.6666667
## 89  0.6666667 0.6875000 0.6666667 0.6153846 0.6666667
## 90  0.6875000 0.6153846 0.6250000 0.5000000 0.5000000
## 91  0.5000000 0.5000000 0.5294118 0.6250000 0.6153846
## 92  0.4444444 0.6666667 0.5833333 0.6428571 0.4545455
## 93  0.5833333 0.4615385 0.7000000 0.6000000 0.5454545
## 94  0.9000000 0.7777778 0.7000000 0.8888889 0.9090909
## 95  0.4166667 0.4545455 0.5454545 0.7000000 0.5000000
## 96  0.5625000 0.6666667 0.5555556 0.6250000 0.6153846
## 97  0.7500000 0.8181818 0.6666667 0.7272727 0.7857143
## 98  0.4666667 0.7142857 0.5833333 0.5625000 0.8181818
## 99  0.4000000 0.5000000 0.5333333 0.4444444 0.4285714
```

```
## 100 0.6666667 0.6000000 0.6666667 0.6428571 0.6666667
## 101 0.8000000 0.9166667 0.7272727 0.7272727 0.6153846
## 102 0.7857143 0.6666667 0.6470588 0.7857143 0.6666667
## 103 0.8181818 0.8000000 0.5833333 0.7500000 0.6153846
## 104 0.4545455 0.4705882 0.4666667 0.4545455 0.6363636
## 105 0.6666667 0.8000000 0.7500000 0.6875000 0.6875000
## 106 0.7058824 0.7222222 0.7500000 0.5882353 0.6111111
## 107 0.7222222 0.6666667 0.6923077 0.7142857 0.7500000
## 108 0.6923077 0.6000000 0.5625000 0.5714286 0.5454545
## 109 0.5000000 0.4615385 0.5333333 0.5454545 0.5333333
## 110 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 111 0.6000000 0.6923077 0.6250000 0.7272727 0.7142857
## 112 0.4166667 0.5000000 0.5555556 0.5625000 0.6000000
## 113 0.6000000 0.6250000 0.7000000 0.6153846 0.6250000
## 114 0.8461538 0.8000000 0.9000000 0.8461538 0.9285714
## 115 0.7500000 0.6923077 0.5384615 0.7142857 0.7500000
## 116 0.9375000 1.0000000 1.0000000 0.9285714 0.9411765
## 117 0.5000000 0.5000000 0.5000000 0.5714286 0.4705882
## 118 0.4285714 0.4166667 0.3571429 0.4615385 0.4666667
## 119 0.8823529 0.8666667 0.9166667 0.8750000 0.8750000
## 120 0.8571429 0.8750000 0.7857143 0.8333333 0.8235294
## 121 0.7272727 0.7058824 0.6363636 0.7500000 0.7333333
## 122 0.6428571 0.4666667 0.6153846 0.5454545 0.5454545
## 123 0.5000000 0.5294118 0.5625000 0.5714286 0.5625000
## 124 0.7368421 0.7647059 0.7500000 0.7500000 0.6875000
## 125 0.8823529 0.8823529 0.9285714 0.8750000 0.9333333
## 126 0.5333333 0.8000000 0.7692308 0.6428571 0.5882353
## 127 0.5625000 0.5294118 0.4705882 0.5333333 0.5000000
## 128 0.5384615 0.5384615 0.6000000 0.7000000 0.5333333
## 129 0.5294118 0.6000000 0.5555556 0.5625000 0.5625000
## 130 0.7272727 0.6666667 0.6666667 0.6923077 0.5833333
## 131 0.5000000 0.5625000 0.5000000 0.5714286 0.5833333
## 132 0.5833333 0.5000000 0.5882353 0.5625000 0.4666667
## 133 0.8125000 0.7333333 0.7647059 0.8823529 0.8333333
## 134 0.8461538 0.8461538 0.7500000 0.7857143 0.8181818
## 135 0.4285714 0.3846154 0.4166667 0.5833333 0.4117647
## 136 0.6666667 0.6363636 0.6666667 0.7000000 0.6000000
## 137 0.6000000 0.5833333 0.7500000 0.5714286 0.6000000
## 138 0.7500000 0.6666667 0.6666667 0.6923077 0.7333333
## 139 0.7857143 0.7142857 0.7857143 0.7142857 0.8571429
## 140 0.8125000 0.8666667 0.8823529 0.8823529 0.9285714
## 141 0.7142857 0.6875000 0.6875000 0.7058824 0.6875000
## 142 0.6666667 0.5882353 0.7142857 0.6666667 0.7058824
## 143 0.9166667 0.8461538 0.8000000 0.7500000 0.8125000
## 144 0.6666667 0.5294118 0.5555556 0.5000000 0.5882353
## 145 0.7333333 0.7777778 0.7692308 0.9230769 0.8571429
## 146 0.6666667 0.7857143 0.6428571 0.8666667 0.7692308
## 147 0.8333333 0.8235294 0.7333333 0.9166667 0.7857143
## 148 0.6000000 0.6470588 0.5882353 0.6428571 0.6000000
## 149 0.6250000 0.5294118 0.3750000 0.5000000 0.5000000
## 150 0.9411765 0.9375000 0.9375000 1.0000000 0.9375000
## 151 0.8000000 0.7500000 0.8000000 0.9090909 0.6250000
## 152 0.8666667 0.8125000 0.8421053 0.7857143 1.0000000
## 153 0.6000000 0.6000000 0.7857143 0.6000000 0.5714286
## 154 0.8333333 0.8666667 0.7857143 0.9375000 0.7857143
## 155 0.8000000 0.7777778 0.7857143 0.8125000 0.7647059
## 156 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 157 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
```

```
## 158 0.6000000 0.5333333 0.6428571 0.5625000 0.5384615
## 159 0.6428571 0.6153846 0.5625000 0.5555556 0.6250000
## 160 0.8125000 0.8125000 0.8888889 0.8421053 0.9375000
## 161 0.8750000 0.7500000 0.8823529 0.9230769 0.8461538
## 162 0.8750000 0.8125000 0.7857143 0.7647059 0.8125000
## 163 0.7647059 0.7894737 0.8125000 0.7777778 0.8666667
## 164 0.9166667 0.7857143 0.9230769 0.8235294 0.8333333
## 165 0.8235294 0.9375000 0.9375000 0.7894737 0.8750000
## 166 0.8750000 1.0000000 0.8947368 0.9333333 0.9166667
## 167 0.7333333 0.7142857 0.6470588 0.7333333 0.6250000
## 168 0.9285714 0.8461538 0.8888889 0.9285714 0.9375000
## 169 0.9411765 1.0000000 0.9375000 0.9473684 0.9444444
## 170 0.7500000 0.6666667 0.6875000 0.6875000 0.7222222
## 171 0.8571429 0.6666667 0.8125000 0.7647059 0.8750000
## 172 0.8000000 0.7692308 0.7142857 0.8000000 0.8000000
## 173 0.5555556 0.6000000 0.5000000 0.5714286 0.5384615
## 174 0.8823529 0.9333333 0.9285714 0.9230769 0.9285714
## 175 0.5384615 0.6000000 0.7142857 0.6923077 0.7000000
## 176 0.7333333 0.6666667 0.8125000 0.8571429 0.7857143
## 177 0.9230769 0.8666667 0.8823529 0.8333333 0.9375000
## 178 0.5789474 0.5000000 0.5384615 0.5000000 0.4615385
## 179 0.6666667 0.5625000 0.7142857 0.6666667 0.7142857
## 180 0.9230769 0.9375000 0.9230769 0.9230769 0.9333333
## 181 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 182 0.6250000 0.6428571 0.7222222 0.7058824 0.7777778
## 183 0.8333333 0.7894737 0.7777778 0.7222222 0.8125000
## 184 0.8000000 0.8750000 0.7777778 0.8000000 0.7333333
## 185 0.8000000 0.7647059 0.6666667 0.8125000 0.8125000
## 186 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 187 0.7777778 0.8125000 0.8125000 0.7857143 0.6666667
## 188 0.8750000 0.9375000 0.8571429 0.8750000 0.9375000
## 189 0.7500000 0.8235294 0.7368421 0.7777778 0.7500000
## 190 0.6250000 0.6000000 0.6470588 0.5625000 0.6000000
## 191 0.7857143 0.7500000 0.8000000 0.8235294 0.8000000
## 192 0.8750000 0.8000000 0.8333333 1.0000000 0.8823529
## 193 0.9444444 1.0000000 1.0000000 0.9444444 0.9473684
## 194 0.7222222 0.7368421 0.7222222 0.6470588 0.7222222
## 195 0.8000000 0.8571429 0.6428571 0.8000000 0.6250000
## 196 1.0000000 0.9333333 0.9285714 0.9444444 0.9333333
## 197 0.7142857 0.9166667 0.7142857 0.7058824 0.6111111
## 198 0.9473684 0.9411765 0.8823529 0.8947368 0.9411765
## 199 0.8666667 0.8750000 0.8750000 0.9411765 0.9411765
## 200 0.9285714 0.8823529 0.9375000 0.9411765 1.0000000
## 201 1.0000000 0.8888889 0.8823529 0.9411765 0.9375000
## 202 0.7333333 0.7500000 0.8000000 0.7333333 0.7333333
## 203 0.7857143 0.8461538 0.7857143 0.7692308 0.7777778
## 204 0.8666667 0.8750000 0.8125000 0.8823529 0.8125000
## 205 0.8947368 0.8888889 0.8823529 0.8823529 0.8888889
## 206 0.9333333 0.8823529 0.8947368 0.8666667 0.9230769
## 207 0.7857143 0.8000000 0.6842105 0.8235294 0.7368421
## 208 0.9285714 0.7222222 0.8235294 0.8333333 0.7777778
## 209 0.6666667 0.6666667 0.7777778 0.7500000 0.7647059
## 210 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 211 0.9444444 0.9411765 0.9444444 0.9375000 1.0000000
## 212 0.8750000 0.8333333 0.8235294 0.8750000 0.8750000
## 213 0.7222222 0.7368421 0.7777778 0.7777778 0.8333333
## 214 0.8750000 0.9333333 1.0000000 0.9375000 0.9375000
## 215 0.7857143 0.8125000 0.7647059 0.7368421 0.8125000
```

```
## 216 0.7777778 0.8000000 0.9166667 0.9230769 0.8421053
## 217 0.8000000 0.9090909 0.8125000 0.7647059 0.8666667
## 218 0.8666667 0.8750000 0.8750000 0.9230769 0.8666667
## 219 0.7777778 0.8461538 0.8666667 0.8235294 0.8000000
## 220 0.8571429 0.8000000 0.7894737 0.7647059 0.9285714
## 221 0.8888889 0.8947368 0.8888889 1.0000000 0.9375000
## 222 0.8666667 1.0000000 0.9444444 0.8947368 1.0000000
## 223 0.9444444 0.9500000 0.9444444 1.0000000 0.9473684
## 224 0.7894737 0.9375000 0.8571429 0.7777778 0.8125000
## 225 0.9375000 0.8750000 0.8823529 0.8421053 0.8235294
## 226 0.8571429 0.8571429 0.9333333 0.7647059 0.8750000
## 227 0.6875000 0.8125000 0.7222222 0.8235294 0.7692308
## 228 0.9444444 0.9285714 0.9444444 1.0000000 1.0000000
## 229 0.9375000 0.9411765 1.0000000 0.9411765 1.0000000
## 230 0.8235294 0.8235294 0.8750000 0.8421053 0.8333333
## 231 0.7894737 0.7500000 0.7500000 0.7894737 0.7894737
## 232 0.8666667 0.8125000 0.8823529 0.8571429 0.8823529
## 233 0.8333333 0.8750000 0.8000000 0.8750000 0.8333333
## 234 0.8823529 0.8571429 0.8750000 0.8235294 0.8888889
## 235 1.0000000 0.9411765 0.9411765 0.9411765 0.9375000
## 236 0.8888889 0.8888889 0.9230769 0.8666667 0.9285714
## 237 0.8823529 0.9411765 0.8823529 0.9333333 0.8571429
## 238 0.9285714 0.9411765 0.9375000 0.9411765 0.9230769
## 239 0.8750000 0.8235294 0.8235294 0.8235294 0.8750000
## 240 0.9411765 0.8750000 0.9375000 0.9333333 1.0000000
## 241 0.9285714 1.0000000 1.0000000 0.9285714 0.9333333
## 242 0.9411765 0.9411765 0.9375000 0.9473684 1.0000000
## 243 0.8823529 0.8823529 0.9444444 0.8500000 0.8823529
## 244 0.9411765 1.0000000 0.9444444 0.8421053 0.8500000
## 245 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 246 0.9500000 0.9411765 1.0000000 1.0000000 0.9411765
## 247 1.0000000 1.0000000 0.9444444 0.9444444 0.9473684
## 248 1.0000000 0.8888889 1.0000000 0.8888889 0.9375000
## 249 0.8235294 0.8823529 0.9375000 0.8888889 0.8750000
## 250 1.0000000 0.8947368 1.0000000 0.8823529 0.9411765
## 251 0.9375000 0.8888889 0.8333333 0.8125000 0.9375000
## 252 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 253 0.9375000 1.0000000 0.9473684 0.9444444 0.9411765
## 254 1.0000000 1.0000000 0.9411765 1.0000000 0.9444444
## 255 0.9411765 0.9411765 1.0000000 0.9444444 0.9444444
## 256 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 257 0.8823529 0.8125000 0.8125000 0.8235294 0.8125000
## 258 0.8947368 0.8947368 0.8823529 1.0000000 1.0000000
## 259 0.8823529 1.0000000 1.0000000 1.0000000 0.9411765
## 260 0.8888889 0.9444444 0.9444444 0.9285714 0.8888889
## 261 0.9375000 0.8750000 0.9411765 0.8666667 0.8823529
## 262 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 263 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 264 1.0000000 0.9444444 1.0000000 0.9444444 1.0000000
## 265 0.9333333 1.0000000 0.8888889 0.8888889 1.0000000
## 266 0.9411765 0.9473684 1.0000000 1.0000000 1.0000000
## 267 0.9473684 1.0000000 1.0000000 1.0000000 1.0000000
## 268 1.0000000 0.9375000 1.0000000 0.9444444 0.9444444
## 269 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 270 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 271 1.0000000 1.0000000 1.0000000 0.9375000 1.0000000
## 272 1.0000000 1.0000000 0.9500000 1.0000000 1.0000000
## 273 0.8888889 0.8947368 0.8750000 0.9333333 1.0000000
```

```
## 274 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 275 0.9444444 0.9285714 1.0000000 1.0000000 1.0000000
## 276 0.8181818 0.7272727 0.7500000 0.8000000 0.8181818
## 277 0.6428571 0.8333333 0.5625000 0.5625000 0.7692308
## 278 0.9000000 0.8888889 0.5555556 0.7000000 0.8000000
## 279 0.6923077 0.7333333 0.7857143 0.9090909 0.7142857
## 280 0.4705882 0.4285714 0.5000000 0.5000000 0.6363636
## 281 1.0000000 1.0000000 1.0000000 1.0000000 1.0000000
## 282 0.6250000 0.7500000 0.7142857 0.6666667 0.6000000
## 283 0.9375000 0.9375000 0.9375000 0.8947368 0.9000000
## 284 0.6470588 0.7500000 0.7333333 0.6250000 0.7142857
## 285 0.8750000 0.8823529 0.8571429 0.8823529 0.9285714
## 286 0.8235294 0.8888889 0.8888889 0.8750000 0.8235294
## 287 0.8235294 0.8235294 0.8235294 0.9285714 0.8666667
## 288 0.8333333 0.8888889 0.8333333 0.8823529 0.8500000
## 289 0.8421053 0.8823529 0.9285714 0.8750000 0.9411765
## 290 0.8947368 0.8666667 0.9285714 1.0000000 0.9333333
## 291 0.8823529 0.9333333 0.8421053 0.8888889 0.8333333
## 292 0.8947368 0.8750000 0.8750000 0.8888889 0.8888889
## 293 0.7647059 0.9230769 0.9333333 0.9285714 0.9333333
## 294 0.8571429 0.8823529 0.8823529 0.8823529 0.8750000
## 295 0.7647059 0.8000000 0.8666667 0.8888889 1.0000000
## 296 0.8750000 0.8947368 0.9411765 0.8666667 0.9333333
## 297 0.8888889 0.8823529 0.9333333 0.8750000 0.8571429
## 298 0.5000000 0.5555556 1.0000000 0.8000000 0.6666667
## 299 0.9444444 1.0000000 1.0000000 1.0000000 0.9444444
## 300 0.8888889 0.9411765 0.8888889 0.9444444 0.9444444
##
## $kappa
##               1           2           3           4           5
## 1    0.13793103 -0.08108108 -0.20689655  0.07692308  0.21568627
## 2    0.40000000  0.54545455  0.15094340  0.28571429  0.20000000
## 3    0.57894737  0.30434783  0.50000000  0.57894737  0.15789474
## 4    0.44444444  0.15789474  0.44444444  0.36842105  0.23809524
## 5    0.23913043  0.20000000  0.20000000  0.16666667  0.20000000
## 6    0.70000000  0.60000000  0.80000000  0.70000000  0.70000000
## 7    0.22222222  0.30000000  0.36842105  0.30000000  0.57894737
## 8    0.23809524  0.42857143  0.30000000  0.23809524  0.25000000
## 9    0.40000000  0.60000000  0.60000000  0.00000000  0.40000000
## 10   0.42857143  0.15789474  0.22222222  0.42857143  0.52941176
## 11   0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 12   0.69387755  0.79166667  0.68085106  0.46808511  0.80000000
## 13   0.50000000  0.40000000  0.50000000  0.60000000  0.60000000
## 14   0.41747573  0.58762887  0.30000000  0.33962264  0.41747573
## 15   0.27083333  0.70000000  0.39393939  0.20792079  0.39393939
## 16   0.60000000  0.40000000  0.40000000  0.40000000  0.60000000
## 17   0.60000000  0.40000000  0.25925926  0.65909091  0.27083333
## 18   0.17525773  0.61165049  0.37500000  0.70000000  0.50000000
## 19   0.57894737  0.57894737  0.76470588  0.42857143  0.76470588
## 20   0.52830189  0.30000000  0.33962264  0.41747573  0.50000000
## 21   0.31372549  0.42307692  0.50980392  0.33962264  0.31372549
## 22   0.30434783  0.52830189  0.15094340  0.33962264  0.33962264
## 23   0.39024390  0.25531915  0.28571429  0.28571429  0.20000000
## 24   0.30000000  0.40000000  0.40000000  0.60000000  0.50000000
## 25   0.25531915  0.21052632  0.14634146 -0.09756098  0.47368421
## 26   0.52380952  0.62500000  0.13043478  0.43181818  0.04761905
## 27   0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 28   0.12087912  0.41747573 -0.03092784  0.17525773  0.41747573
```

```
## 29   0.04255319  0.22222222  0.34782609  0.34782609  0.37500000
## 30   0.37500000  0.44444444  0.32692308  0.32692308  0.40000000
## 31   0.30000000  0.60000000  0.30000000  0.50000000  0.00000000
## 32   0.59595960  0.58762887  0.70000000  0.30000000  0.70588235
## 33   0.04255319  0.46808511  0.70000000  0.33962264  0.20454545
## 34   0.58762887  0.50000000  0.44954128  0.50000000  0.61165049
## 35   0.60000000  0.50000000  0.80000000  0.80000000  0.80000000
## 36   0.61538462  0.03846154  0.44444444  0.36363636  0.50980392
## 37   0.22330097  0.30000000  0.38144330  0.50000000  0.30000000
## 38  -0.10000000  0.44954128 -0.03092784  0.10000000 -0.10000000
## 39   0.20000000  0.40000000  0.10000000  0.00000000  0.00000000
## 40   0.50000000  0.50000000  0.50000000  0.70000000  0.90000000
## 41   0.32692308  0.80198020  0.61165049  0.70000000  0.90000000
## 42   0.50000000  0.40000000  0.20000000  0.80000000 -0.20000000
## 43   0.60000000  0.58333333  0.04255319  0.28571429  0.25531915
## 44   0.50000000  0.40000000  0.30000000  0.20000000  0.00000000
## 45   0.60000000  0.50000000  0.60000000  0.50000000  0.50000000
## 46   0.34782609  0.13043478  0.13043478  0.89795918  0.50980392
## 47   0.34782609  0.27083333  0.34782609  0.37500000  0.34782609
## 48   0.31372549  0.08163265  0.25531915  0.41860465  0.20000000
## 49   0.16666667  0.40000000  0.37500000  0.28571429  0.22222222
## 50   0.70588235  0.69387755  0.52830189  0.20000000  0.42307692
## 51   0.60396040  0.60396040  0.50000000  0.22330097  0.51923077
## 52   0.30000000  0.50000000  0.29411765  0.42857143  0.44444444
## 53   0.38144330  0.39393939  0.59595960  0.27083333  0.20792079
## 54   0.42307692  0.15094340  0.44444444  0.69387755  0.58333333
## 55   0.57894737  0.37500000  0.30000000  0.52941176  0.44444444
## 56   0.54545455  0.40000000  0.31818182  0.15094340 -0.13636364
## 57   0.50980392  0.10000000 -0.12244898  0.31372549  0.58762887
## 58   0.48979592  0.48979592  0.80000000  0.60000000  0.50980392
## 59   0.40594059  0.48979592  0.69387755  0.58762887  0.50000000
## 60   0.52380952  0.20454545  0.20000000  0.43181818  0.20454545
## 61   0.20000000  0.50000000  0.50000000  0.60000000  0.20000000
## 62   0.38144330  0.58762887  0.27083333  0.39393939  0.50980392
## 63   0.27083333  0.25531915  0.38144330  0.36842105  0.38144330
## 64   0.43181818  0.65909091  0.47368421  0.13043478  0.12500000
## 65   0.20000000  0.40000000  0.10000000  0.20000000  0.30000000
## 66   0.32692308  0.32692308  0.32692308  0.04761905  0.42857143
## 67   0.02912621  0.00990099 -0.05769231  0.00990099  0.02912621
## 68   0.33962264  0.50000000  0.70588235  0.40594059  0.11764706
## 69   0.08163265 -0.35416667 -0.03092784  0.27083333  0.17525773
## 70   0.00000000  0.42307692  0.44444444  0.50980392  0.42307692
## 71   0.32692308  0.20000000 -0.20000000  0.56521739  0.20454545
## 72   0.60000000  0.40000000  0.70000000  0.40000000  0.10000000
## 73   0.10000000  0.48979592  0.40594059  0.31372549  0.39393939
## 74   0.39393939  0.39393939  0.19191919  0.47916667  0.27083333
## 75   0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 76   0.68750000  0.60000000  0.44444444  0.51923077  0.60000000
## 77   0.46808511  0.37500000  0.50980392  0.60000000  0.31372549
## 78   0.22330097  0.50980392 -0.12244898  0.15094340  0.60396040
## 79   0.11764706  0.07894737  0.07894737  0.02173913  0.50000000
## 80   0.34065934  0.12087912  0.04255319 -0.03092784  0.04255319
## 81   0.44444444  0.15094340  0.40000000  0.61538462  0.03846154
## 82  -0.08695652  0.54545455  0.08163265 -0.30434783  0.22222222
## 83   0.23076923  0.18181818  0.50980392  0.36363636  0.61538462
## 84  -0.15384615 -0.15384615  0.07894737 -0.07142857 -0.17647059
## 85   0.24050633 -0.04651163  0.30555556 -0.25000000  0.30555556
## 86   0.20000000  0.10000000  0.40000000  0.20000000  0.10000000
```

```
## 87   0.00990099  0.23809524  0.31372549  0.50980392  0.20792079
## 88   0.40000000  0.10000000  0.40000000  0.40000000  0.40000000
## 89   0.22222222  0.31818182  0.22222222  0.04255319  0.16666667
## 90   0.46808511  0.17525773  0.25531915 -0.19565217 -0.14583333
## 91   0.00000000  0.00000000  0.10000000  0.40000000  0.30000000
## 92  -0.01851852  0.39393939  0.31372549  0.51923077  0.00990099
## 93   0.42307692  0.15094340  0.60000000  0.40000000  0.31372549
## 94   0.40000000  0.13461538  0.00000000  0.32692308  0.47916667
## 95   0.03846154  0.11764706  0.31372549  0.60000000  0.25925926
## 96   0.20000000  0.50000000  0.20000000  0.40000000  0.30000000
## 97   0.25531915  0.38144330  0.05882353  0.17525773  0.43181818
## 98  -0.26315789  0.47916667  0.08163265  0.04255319  0.59595960
## 99  -0.14285714  0.15094340  0.23809524 -0.01851852 -0.05769231
## 100  0.22222222  0.00000000  0.22222222  0.13043478  0.16666667
## 101  0.52941176  0.68085106  0.17525773  0.17525773 -0.09890110
## 102  0.56521739  0.22222222  0.18604651  0.56521739  0.28571429
## 103  0.48979592  0.40000000 -0.04166667  0.37500000  0.04255319
## 104  0.11764706  0.21052632  0.18181818  0.11764706  0.50980392
## 105  0.07894737  0.52941176  0.25531915  0.14634146  0.14634146
## 106  0.24050633  0.34210526  0.39024390 -0.26582278 -0.18421053
## 107  0.11764706 -0.17647059 -0.02272727  0.04761905  0.13043478
## 108  0.50000000  0.30000000  0.20000000  0.20000000  0.10000000
## 109  0.08163265  0.02912621  0.23809524  0.20792079  0.23809524
## 110  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 111  0.00000000  0.25531915  0.09090909  0.28571429  0.34782609
## 112 -0.20000000  0.00000000  0.20000000  0.20000000  0.30000000
## 113  0.00000000  0.09090909  0.20000000  0.04255319  0.09090909
## 114 -0.01265823 -0.23076923  0.10000000 -0.01265823  0.30555556
## 115  0.37500000  0.25531915 -0.17021277  0.34782609  0.37500000
## 116 -0.08695652  0.14634146  0.17808219 -0.09375000 -0.08108108
## 117  0.15094340  0.13461538  0.16666667  0.32692308  0.06542056
## 118  0.19642857  0.15094340  0.01785714  0.26605505  0.30434783
## 119  0.21568627  0.07692308  0.18604651  0.13793103  0.13793103
## 120  0.02777778  0.13793103 -0.25000000 -0.04651163 -0.17647059
## 121  0.06250000  0.02777778 -0.14583333  0.21052632  0.12500000
## 122  0.51923077  0.04761905  0.41747573  0.20792079  0.20792079
## 123 -0.17021277 -0.07526882  0.04255319  0.06250000  0.04255319
## 124  0.21875000  0.30555556  0.21052632  0.21052632 -0.05263158
## 125 -0.13636364 -0.13636364  0.11764706 -0.15384615  0.16666667
## 126 -0.22222222  0.40000000  0.46808511  0.13043478 -0.04651163
## 127  0.33962264  0.25233645  0.06542056  0.23809524  0.15094340
## 128  0.22330097  0.22330097  0.42857143  0.50000000  0.23809524
## 129  0.10000000  0.30000000  0.20000000  0.20000000  0.20000000
## 130  0.50000000  0.50000000  0.40000000  0.50000000  0.20000000
## 131  0.00000000  0.20000000  0.00000000  0.20000000  0.20000000
## 132  0.20000000  0.00000000  0.30000000  0.20000000 -0.10000000
## 133  0.28571429 -0.06666667  0.07692308  0.69230769  0.22222222
## 134  0.29411765  0.29411765  0.00000000  0.12500000  0.15789474
## 135 -0.05769231 -0.16504854 -0.07843137  0.31372549 -0.12149533
## 136  0.22222222  0.08163265  0.16666667  0.20000000  0.00000000
## 137  0.15789474  0.08163265  0.48979592  0.06250000  0.15789474
## 138  0.25531915  0.05882353  0.05882353  0.12087912  0.29411765
## 139 -0.05263158 -0.31578947 -0.05263158 -0.31578947  0.21052632
## 140 -0.20689655  0.07692308  0.21568627  0.21568627  0.30555556
## 141  0.34782609  0.31818182  0.31818182  0.41860465  0.31818182
## 142  0.28571429 -0.04651163  0.34782609  0.22222222  0.41860465
## 143  0.31818182  0.14634146  0.00000000 -0.25000000  0.06250000
## 144  0.50000000  0.10000000  0.20000000  0.00000000  0.30000000
```

```
## 145 -0.06666667  0.04761905  0.05882353  0.52941176  0.37500000
## 146 -0.33333333  0.12500000 -0.37500000  0.46666667  0.05882353
## 147  0.09090909  0.13793103 -0.28571429  0.31818182 -0.05263158
## 148  0.00000000  0.18604651 -0.04651163  0.13043478  0.00000000
## 149  0.40000000  0.10000000 -0.40000000  0.00000000  0.00000000
## 150  0.31818182  0.23076923  0.23076923  0.28571429  0.23076923
## 151  0.37500000  0.21052632  0.37500000  0.47916667 -0.31578947
## 152  0.28571429  0.06250000  0.34782609 -0.05263158  0.63414634
## 153  0.15789474  0.15789474  0.68750000  0.15789474  0.06250000
## 154 -0.13636364  0.07692308 -0.25000000  0.48275862 -0.25000000
## 155  0.20000000  0.16666667  0.12500000  0.28571429  0.07692308
## 156  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 157  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 158  0.15789474 -0.05263158  0.27083333  0.04255319 -0.03092784
## 159  0.27083333  0.17525773  0.04255319  0.02173913  0.25531915
## 160 -0.20689655 -0.20689655  0.31818182 -0.08108108  0.48275862
## 161  0.37500000 -0.25000000  0.48275862  0.39024390  0.14634146
## 162  0.57142857  0.28571429  0.12500000  0.07692308  0.28571429
## 163  0.07692308  0.27272727  0.28571429  0.16666667  0.46666667
## 164  0.31818182 -0.05263158  0.39024390  0.13793103  0.09090909
## 165  0.13793103  0.68750000  0.68750000 -0.08695652  0.37500000
## 166 -0.15384615  0.23913043 -0.07142857  0.16666667  0.04761905
## 167  0.29411765  0.20454545 -0.01265823  0.29411765 -0.09756098
## 168  0.11764706 -0.18421053 -0.11111111  0.11764706  0.23076923
## 169 -0.08108108  0.27272727 -0.08695652 -0.05263158 -0.07142857
## 170  0.39024390  0.07894737  0.14634146  0.14634146  0.34210526
## 171  0.21052632 -0.36363636  0.06250000 -0.20689655  0.37500000
## 172  0.20000000  0.05882353 -0.12500000  0.20000000  0.20000000
## 173  0.20000000  0.30000000  0.00000000  0.20000000  0.10000000
## 174 -0.13636364  0.16666667  0.11764706  0.07894737  0.11764706
## 175 -0.17021277  0.00000000  0.34782609  0.25531915  0.20000000
## 176  0.12500000 -0.12500000  0.47368421  0.52380952  0.28571429
## 177  0.24050633  0.07692308  0.21568627 -0.13636364  0.48275862
## 178  0.12087912 -0.14583333 -0.03092784 -0.19565217 -0.23711340
## 179  0.22222222 -0.13636364  0.34782609  0.22222222  0.34782609
## 180  0.24050633  0.48275862  0.24050633  0.24050633  0.38461538
## 181  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 182 -0.31578947 -0.19047619  0.11764706  0.02777778  0.41176471
## 183  0.50000000  0.27272727  0.16666667 -0.16666667  0.28571429
## 184  0.20000000  0.57142857  0.16666667  0.20000000 -0.06666667
## 185  0.20000000  0.07692308 -0.33333333  0.28571429  0.28571429
## 186  0.45945946  0.21875000  0.17808219  0.27272727  0.21875000
## 187  0.16666667  0.28571429  0.28571429  0.12500000 -0.33333333
## 188  0.13793103  0.48275862  0.02777778  0.13793103  0.48275862
## 189  0.00000000  0.38461538 -0.09090909  0.16666667  0.00000000
## 190  0.09090909  0.00000000  0.18604651 -0.13636364  0.00000000
## 191  0.12500000  0.00000000  0.20000000  0.38461538  0.20000000
## 192  0.13793103 -0.23076923 -0.04651163  0.69230769  0.21568627
## 193 -0.07142857  0.45945946  0.17808219 -0.07142857 -0.05263158
## 194  0.11764706  0.21875000  0.11764706 -0.25000000  0.11764706
## 195  0.52941176  0.65909091 -0.02272727  0.52941176 -0.09756098
## 196  0.27272727 -0.09090909 -0.09375000 -0.07142857 -0.09090909
## 197  0.34782609  0.79166667  0.34782609  0.41860465  0.04761905
## 198  0.64285714  0.31818182 -0.13636364 -0.07142857  0.31818182
## 199 -0.16666667 -0.15384615 -0.15384615  0.31818182  0.31818182
## 200  0.11764706 -0.13636364  0.23076923  0.31818182  0.50000000
## 201  0.61538462 -0.11111111 -0.13636364  0.31818182  0.23076923
## 202  0.44444444  0.54545455  0.66666667  0.44444444  0.44444444
```

```
## 203 -0.05263158  0.14634146 -0.05263158 -0.09756098 -0.15384615
## 204  0.28571429  0.37500000  0.06250000  0.48275862  0.06250000
## 205  0.45945946  0.31818182  0.21568627  0.21568627  0.31818182
## 206  0.16666667 -0.13636364 -0.07142857 -0.16666667  0.07894737
## 207  0.28571429  0.37500000 -0.09375000  0.58333333  0.21875000
## 208  0.62500000 -0.16666667  0.38461538  0.50000000  0.16666667
## 209 -0.12500000 -0.17647059  0.41176471  0.21052632  0.30555556
## 210  0.17808219  0.21875000  0.45945946  0.34782609  0.64285714
## 211  0.44444444  0.31818182  0.44444444  0.23076923  0.50000000
## 212  0.37500000  0.23076923  0.13793103  0.37500000  0.37500000
## 213 -0.16666667 -0.09090909  0.16666667  0.16666667  0.50000000
## 214  0.13793103  0.38461538  0.58333333  0.48275862  0.48275862
## 215  0.12500000  0.28571429  0.07692308 -0.09090909  0.28571429
## 216 -0.15384615  0.00000000  0.31818182  0.39024390  0.34782609
## 217  0.00000000  0.25531915  0.06250000 -0.20689655  0.28571429
## 218  0.46666667  0.57142857  0.57142857  0.52941176  0.46666667
## 219  0.16666667  0.29411765  0.46666667  0.38461538  0.20000000
## 220  0.37500000  0.20000000  0.27272727  0.07692308  0.62500000
## 221  0.31818182  0.45945946  0.31818182  0.41860465  0.48275862
## 222  0.07692308  0.58333333  0.77272727  0.45945946  0.41860465
## 223 -0.07142857  0.00000000 -0.07142857  0.45945946 -0.05263158
## 224 -0.08695652  0.68750000  0.21052632 -0.15384615  0.06250000
## 225  0.68750000  0.37500000  0.48275862  0.34782609  0.13793103
## 226  0.52380952  0.52380952  0.87500000  0.30555556  0.73684211
## 227 -0.05263158  0.47368421  0.11764706  0.58333333  0.20454545
## 228 -0.07142857 -0.09375000 -0.07142857  0.64285714  0.21875000
## 229 -0.08695652 -0.08108108  0.34782609 -0.08108108  0.34782609
## 230  0.13793103  0.13793103  0.37500000  0.34782609  0.23076923
## 231  0.27272727  0.00000000  0.00000000  0.27272727  0.27272727
## 232  0.46666667  0.28571429  0.69230769  0.37500000  0.69230769
## 233  0.23076923  0.37500000  0.00000000  0.37500000  0.23076923
## 234  0.21568627  0.02777778  0.13793103 -0.17647059  0.31818182
## 235  0.34782609 -0.08108108 -0.08108108 -0.08108108 -0.08695652
## 236  0.31818182  0.31818182  0.24050633  0.07692308  0.30555556
## 237 -0.13636364  0.31818182 -0.13636364  0.16666667 -0.17647059
## 238 -0.09375000 -0.08108108 -0.08695652 -0.08108108 -0.09589041
## 239  0.13793103 -0.17647059 -0.17647059 -0.17647059  0.13793103
## 240  0.31818182 -0.15384615  0.23076923  0.16666667  0.50000000
## 241 -0.09375000  0.27272727  0.21875000 -0.09375000 -0.09090909
## 242 -0.08108108 -0.08108108 -0.08695652 -0.05263158  0.45945946
## 243  0.21568627  0.21568627  0.77272727  0.00000000  0.21568627
## 244  0.60784314  0.49367089  0.77272727 -0.08108108  0.00000000
## 245  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 246  0.00000000 -0.08108108  0.34782609  0.27272727 -0.08108108
## 247  0.27272727  0.27272727 -0.07142857 -0.07142857 -0.05263158
## 248  0.49367089  0.31818182  0.58333333  0.31818182  0.48275862
## 249  0.13793103  0.48275862  0.68750000  0.61538462  0.37500000
## 250  0.82758621  0.45945946  0.82758621  0.21568627  0.60784314
## 251  0.48275862  0.31818182 -0.13636364 -0.20689655  0.48275862
## 252  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 253 -0.08695652  0.34782609 -0.05263158 -0.07142857 -0.08108108
## 254  0.64285714  0.64285714 -0.08108108  0.45945946 -0.07142857
## 255  0.31818182  0.31818182  0.61538462  0.44444444  0.44444444
## 256  0.50000000  0.61538462  0.77272727  0.77272727  0.50000000
## 257  0.48275862  0.06250000  0.06250000  0.13793103  0.06250000
## 258 -0.07142857 -0.07142857 -0.13636364  0.50000000  0.50000000
## 259 -0.13636364  0.41176471  0.41176471  0.41176471  0.31818182
## 260 -0.11111111  0.44444444  0.44444444  0.11764706 -0.11111111
```

```
## 261  0.23076923 -0.15384615  0.31818182 -0.16666667 -0.13636364
## 262  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 263  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 264  0.45945946 -0.07142857  0.17808219 -0.07142857  0.21875000
## 265  0.38461538  0.69230769  0.31818182  0.31818182  0.82758621
## 266 -0.08108108 -0.05263158  0.27272727  0.34782609  0.64285714
## 267  0.64285714  0.77272727  0.77272727  0.61538462  0.50000000
## 268  0.50000000  0.23076923  1.00000000  0.44444444  0.44444444
## 269  0.64285714  0.27272727  0.64285714  0.34782609  0.64285714
## 270  0.34782609  0.45945946  0.64285714  0.34782609  0.45945946
## 271  0.34782609  0.45945946  0.21875000 -0.08695652  0.27272727
## 272  0.34782609  0.27272727  0.00000000  0.34782609  0.21875000
## 273 -0.11111111 -0.07142857 -0.15384615  0.16666667  0.61538462
## 274  0.45945946  0.34782609  0.64285714  0.45945946  0.64285714
## 275  0.44444444  0.11764706  0.61538462  0.50000000  0.50000000
## 276  0.27083333  0.06250000  0.07407407  0.20000000  0.27083333
## 277  0.13043478  0.58333333 -0.13636364 -0.13636364  0.46808511
## 278  0.50000000  0.41747573 -0.16504854  0.10000000  0.30000000
## 279  0.12087912  0.29411765  0.43181818  0.58762887  0.20454545
## 280  0.06542056 -0.05769231  0.16666667  0.16666667  0.40594059
## 281  0.27272727  0.64285714  0.45945946  0.64285714  0.34782609
## 282 -0.09756098  0.39024390  0.20454545  0.05882353 -0.17647059
## 283  0.23076923  0.23076923  0.23076923 -0.07142857  0.00000000
## 284 -0.25000000  0.21052632  0.12500000 -0.31578947  0.04761905
## 285  0.13793103  0.21568627  0.02777778  0.21568627  0.30555556
## 286 -0.17647059  0.31818182  0.31818182  0.13793103 -0.17647059
## 287  0.38461538  0.38461538  0.38461538  0.62500000  0.46666667
## 288 -0.13636364  0.31818182 -0.13636364  0.21568627  0.00000000
## 289  0.34782609  0.48275862  0.47368421  0.37500000  0.82758621
## 290 -0.07142857 -0.16666667  0.11764706  0.50000000  0.16666667
## 291  0.21568627  0.38461538 -0.08108108  0.31818182 -0.13636364
## 292  0.45945946  0.13793103  0.13793103  0.31818182  0.31818182
## 293 -0.20689655  0.39024390  0.57142857  0.47368421  0.57142857
## 294  0.21052632  0.48275862  0.48275862  0.48275862  0.37500000
## 295 -0.20689655  0.00000000  0.28571429  0.61538462  1.00000000
## 296  0.13793103  0.45945946  0.60784314  0.07692308  0.38461538
## 297  0.31818182  0.21568627  0.38461538  0.13793103  0.02777778
## 298  0.00000000  0.10000000  0.70000000  0.60000000  0.40000000
## 299  0.44444444  0.77272727  0.61538462  0.77272727  0.44444444
## 300 -0.11111111  0.31818182 -0.11111111  0.44444444  0.44444444
##
## $TSS
##              1           2           3           4           5
## 1    0.12500000 -0.15789474 -0.18750000  0.06666667  0.21568627
## 2    0.40000000  0.50000000  0.16161616  0.33333333  0.20000000
## 3    0.55555556  0.38461538  0.50000000  0.55555556  0.15151515
## 4    0.41666667  0.15151515  0.41666667  0.35353535  0.25252525
## 5    0.22222222  0.20000000  0.20000000  0.18181818  0.20000000
## 6    0.70707071  0.60000000  0.83333333  0.70707071  0.76923077
## 7    0.20833333  0.30000000  0.35353535  0.30000000  0.55555556
## 8    0.25252525  0.45454545  0.30000000  0.25252525  0.35714286
## 9    0.41666667  0.71428571  0.62500000  0.00000000  0.47619048
## 10   0.45454545  0.15151515  0.20833333  0.45454545  0.49450549
## 11   0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 12   0.68686869  0.79166667  0.70329670  0.48351648  0.80000000
## 13   0.54945055  0.40000000  0.50505051  0.60000000  0.62500000
## 14   0.43434343  0.57575758  0.30000000  0.37500000  0.43434343
## 15   0.30952381  0.70000000  0.39393939  0.21212121  0.39393939
```

```
## 16   0.62500000  0.41666667  0.40000000  0.41666667  0.71428571
## 17   0.60000000  0.40000000  0.29166667  0.63736264  0.26262626
## 18   0.17171717  0.63636364  0.50000000  0.70000000  0.50000000
## 19   0.55555556  0.55555556  0.71428571  0.45454545  0.71428571
## 20   0.58333333  0.30000000  0.37500000  0.43434343  0.50000000
## 21   0.32323232  0.45833333  0.52525253  0.39560440  0.32323232
## 22   0.46666667  0.58333333  0.16666667  0.37500000  0.37500000
## 23   0.35164835  0.24242424  0.33333333  0.33333333  0.20000000
## 24   0.30303030  0.41666667  0.41666667  0.62500000  0.66666667
## 25   0.24242424  0.19047619  0.13186813 -0.08791209  0.42857143
## 26   0.52380952  0.66666667  0.12500000  0.41758242  0.04761905
## 27   0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 28   0.12087912  0.43434343 -0.03030303  0.17171717  0.43434343
## 29   0.04395604  0.26666667  0.38095238  0.38095238  0.37500000
## 30   0.46153846  0.50000000  0.34343434  0.34343434  0.40000000
## 31   0.30303030  0.62500000  0.30303030  0.54945055  0.00000000
## 32   0.59595960  0.62637363  0.70000000  0.30000000  0.75000000
## 33   0.04166667  0.45833333  0.70000000  0.37500000  0.21428571
## 34   0.57575758  0.50000000  0.53846154  0.50000000  0.63636364
## 35   0.62500000  0.50505051  0.83333333  0.83333333  0.80000000
## 36   0.66666667  0.04166667  0.57142857  0.53333333  0.52525253
## 37   0.23232323  0.30000000  0.37373737  0.50000000  0.30000000
## 38  -0.10000000  0.53846154 -0.03030303  0.10000000 -0.10000000
## 39   0.20000000  0.40000000  0.10101010  0.00000000  0.00000000
## 40   0.50505051  0.50505051  0.50505051  0.70707071  0.90909091
## 41   0.40476190  0.81818182  0.69230769  0.70000000  0.90000000
## 42   0.66666667  0.47619048  0.20833333  0.80000000 -0.23809524
## 43   0.60000000  0.58333333  0.04395604  0.28282828  0.26373626
## 44   0.50505051  0.47619048  0.32967033  0.20833333  0.00000000
## 45   0.62500000  0.50505051  0.62500000  0.50505051  0.54945055
## 46   0.38095238  0.14285714  0.14285714  0.88888889  0.52525253
## 47   0.33333333  0.26262626  0.33333333  0.40000000  0.33333333
## 48   0.32323232  0.08080808  0.26373626  0.70588235  0.20000000
## 49   0.16666667  0.40000000  0.37500000  0.28282828  0.26666667
## 50   0.72727273  0.68686869  0.61538462  0.20000000  0.45833333
## 51   0.61616162  0.61616162  0.50000000  0.25274725  0.64285714
## 52   0.30000000  0.50000000  0.27472527  0.45454545  0.41666667
## 53   0.40659341  0.39393939  0.59595960  0.30952381  0.21212121
## 54   0.45833333  0.17582418  0.57142857  0.68686869  0.58333333
## 55   0.55555556  0.35714286  0.30000000  0.49450549  0.41666667
## 56   0.50000000  0.40000000  0.29166667  0.16161616 -0.12500000
## 57   0.54166667  0.10000000 -0.12500000  0.33333333  0.62637363
## 58   0.48484848  0.48484848  0.80000000  0.60000000  0.52525253
## 59   0.41414141  0.50000000  0.70833333  0.62637363  0.50000000
## 60   0.52380952  0.19780220  0.20000000  0.41758242  0.19780220
## 61   0.20833333  0.50505051  0.50505051  0.62500000  0.20833333
## 62   0.40659341  0.62637363  0.30952381  0.39393939  0.54166667
## 63   0.30952381  0.37500000  0.40659341  0.46666667  0.40659341
## 64   0.41758242  0.63736264  0.56250000  0.12500000  0.13333333
## 65   0.23809524  0.47619048  0.19607843  0.31250000  0.30303030
## 66   0.40476190  0.40476190  0.40476190  0.06666667  0.60000000
## 67   0.03296703  0.01010101 -0.07142857  0.01010101  0.03296703
## 68   0.56250000  0.50000000  0.75000000  0.41414141  0.12500000
## 69   0.08333333 -0.40476190 -0.03296703  0.30952381  0.18681319
## 70   0.00000000  0.45833333  0.57142857  0.52525253  0.45833333
## 71   0.34343434  0.20000000 -0.20000000  0.54166667  0.19780220
## 72   0.60000000  0.41666667  0.70707071  0.47619048  0.10989011
## 73   0.10000000  0.50000000  0.41414141  0.33333333  0.39393939
```

```
## 74   0.39393939  0.39393939  0.19191919  0.54761905  0.30952381
## 75   0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 76   0.66666667  0.60000000  0.50000000  0.54545455  0.60000000
## 77   0.48351648  0.37500000  0.52525253  0.60000000  0.32323232
## 78   0.25274725  0.54166667 -0.12500000  0.25000000  0.61616162
## 79   0.09523810  0.06593407  0.06593407  0.02020202  0.40000000
## 80   0.34065934  0.12087912  0.04166667 -0.03030303  0.04166667
## 81   0.57142857  0.17582418  0.40000000  0.66666667  0.04166667
## 82  -0.09523810  0.75000000  0.08080808 -0.33333333  0.26666667
## 83   0.25000000  0.26666667  0.52525253  0.53333333  0.66666667
## 84  -0.12500000 -0.12500000  0.06593407 -0.10526316 -0.14285714
## 85   0.20879121 -0.04166667  0.26190476 -0.21428571  0.26190476
## 86   0.55555556  0.19607843  0.62500000  0.31250000  0.10989011
## 87   0.01010101  0.33333333  0.33333333  0.54166667  0.21212121
## 88   0.41666667  0.13333333  0.41666667  0.41666667  0.41666667
## 89   0.26666667  0.43750000  0.26666667  0.04395604  0.16666667
## 90   0.68750000  0.18681319  0.37500000 -0.50000000 -0.16666667
## 91   0.00000000  0.00000000  0.19607843  0.62500000  0.32967033
## 92  -0.05555556  0.39393939  0.33333333  0.64285714  0.01010101
## 93   0.45833333  0.17582418  0.60000000  0.40000000  0.32323232
## 94   0.40000000  0.14141414  0.00000000  0.34343434  0.46464646
## 95   0.04166667  0.12121212  0.32323232  0.60000000  0.33333333
## 96   0.31250000  0.66666667  0.55555556  0.62500000  0.32967033
## 97   0.25000000  0.37373737  0.06666667  0.17171717  0.45238095
## 98  -0.33333333  0.54761905  0.08333333  0.06250000  0.59595960
## 99  -0.20000000  0.25000000  0.33333333 -0.05555556 -0.07142857
## 100  0.26666667  0.00000000  0.26666667  0.14285714  0.16666667
## 101  0.60000000  0.66666667  0.17171717  0.17171717 -0.09890110
## 102  0.61904762  0.26666667  0.31372549  0.61904762  0.66666667
## 103  0.48484848  0.40000000 -0.04166667  0.37500000  0.04395604
## 104  0.12121212  0.47058824  0.26666667  0.12121212  0.52525253
## 105  0.16666667  0.60000000  0.25000000  0.18750000  0.18750000
## 106  0.37254902  0.72222222  0.50000000 -0.41176471 -0.38888889
## 107  0.22222222 -0.33333333 -0.02197802  0.04761905  0.12500000
## 108  0.54945055  0.40000000  0.31250000  0.23809524  0.10101010
## 109  0.08333333  0.03296703  0.33333333  0.21212121  0.33333333
## 110  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 111  0.00000000  0.26373626  0.12500000  0.28282828  0.38095238
## 112 -0.20833333  0.00000000  0.55555556  0.31250000  0.40000000
## 113  0.00000000  0.12500000  0.20000000  0.04395604  0.12500000
## 114 -0.01098901 -0.20000000  0.10000000 -0.01098901  0.26190476
## 115  0.37500000  0.26373626 -0.17582418  0.38095238  0.37500000
## 116 -0.06250000  0.12500000  0.14285714 -0.07142857 -0.05882353
## 117  0.25000000  0.16666667  0.50000000  0.40476190  0.13725490
## 118  0.26190476  0.16666667  0.02380952  0.31868132  0.46666667
## 119  0.21568627  0.06666667  0.16666667  0.12500000  0.12500000
## 120  0.02380952  0.12500000 -0.21428571 -0.04166667 -0.17647059
## 121  0.06060606  0.03921569 -0.14141414  0.25000000  0.13333333
## 122  0.64285714  0.06666667  0.47252747  0.21212121  0.21212121
## 123 -0.25000000 -0.13725490  0.06250000  0.07142857  0.06250000
## 124  0.73684211  0.43137255  0.25000000  0.25000000 -0.06250000
## 125 -0.11764706 -0.11764706  0.09523810 -0.12500000  0.13333333
## 126 -0.26666667  0.40000000  0.48351648  0.14285714 -0.07843137
## 127  0.56250000  0.52941176  0.13725490  0.33333333  0.25000000
## 128  0.25274725  0.25274725  0.60000000  0.50000000  0.33333333
## 129  0.19607843  0.40000000  0.55555556  0.31250000  0.31250000
## 130  0.50505051  0.66666667  0.41666667  0.54945055  0.20833333
## 131  0.00000000  0.31250000  0.00000000  0.23809524  0.20833333
```

```
## 132  0.20833333  0.00000000  0.58823529  0.31250000 -0.13333333
## 133  0.31250000 -0.06666667  0.09803922  0.88235294  0.20833333
## 134  0.27472527  0.27472527  0.00000000  0.11904762  0.15151515
## 135 -0.07142857 -0.18681319 -0.08333333  0.33333333 -0.25490196
## 136  0.26666667  0.08080808  0.16666667  0.20000000  0.00000000
## 137  0.20000000  0.08333333  0.50000000  0.07142857  0.20000000
## 138  0.25000000  0.06666667  0.06666667  0.12087912  0.33333333
## 139 -0.04761905 -0.28571429 -0.04761905 -0.28571429  0.19047619
## 140 -0.18750000  0.06666667  0.21568627  0.21568627  0.26190476
## 141  0.38095238  0.43750000  0.43750000  0.70588235  0.43750000
## 142  0.66666667 -0.07843137  0.38095238  0.26666667  0.70588235
## 143  0.29166667  0.13186813  0.00000000 -0.25000000  0.06250000
## 144  0.66666667  0.19607843  0.55555556  0.00000000  0.58823529
## 145 -0.06666667  0.05050505  0.05494505  0.49450549  0.35714286
## 146 -0.33333333  0.11904762 -0.35714286  0.46666667  0.05494505
## 147  0.08333333  0.15686275 -0.26666667  0.29166667 -0.04761905
## 148  0.00000000  0.31372549 -0.07843137  0.14285714  0.00000000
## 149  0.62500000  0.19607843 -0.62500000  0.00000000  0.00000000
## 150  0.27450980  0.18750000  0.18750000  0.25000000  0.18750000
## 151  0.40000000  0.25000000  0.40000000  0.46464646 -0.37500000
## 152  0.26666667  0.06250000  0.84210526 -0.04761905  0.57142857
## 153  0.20000000  0.20000000  0.78571429  0.20000000  0.07142857
## 154 -0.16666667  0.06666667 -0.21428571  0.43750000 -0.21428571
## 155  0.20000000  0.27777778  0.11904762  0.31250000  0.09803922
## 156  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 157  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 158  0.20000000 -0.06666667  0.30952381  0.06250000 -0.03296703
## 159  0.30952381  0.18681319  0.06250000  0.05555556  0.37500000
## 160 -0.18750000 -0.18750000  0.38888889 -0.15789474  0.43750000
## 161  0.37500000 -0.25000000  0.54901961  0.35164835  0.13186813
## 162  0.62500000  0.31250000  0.11904762  0.09803922  0.31250000
## 163  0.09803922  0.78947368  0.31250000  0.27777778  0.46666667
## 164  0.29166667 -0.04761905  0.35164835  0.15686275  0.08333333
## 165  0.15686275  0.68750000  0.68750000 -0.21052632  0.37500000
## 166 -0.12500000  0.22222222 -0.10526316  0.13333333  0.04166667
## 167  0.33333333  0.21428571 -0.01960784  0.33333333 -0.12500000
## 168  0.09523810 -0.15384615 -0.11111111  0.09523810  0.18750000
## 169 -0.05882353  0.20000000 -0.06250000 -0.05263158 -0.05555556
## 170  0.50000000  0.16666667  0.18750000  0.18750000  0.72222222
## 171  0.19047619 -0.33333333  0.06250000 -0.23529412  0.37500000
## 172  0.20000000  0.05494505 -0.11904762  0.20000000  0.20000000
## 173  0.55555556  0.40000000  0.00000000  0.23809524  0.10989011
## 174 -0.11764706  0.13333333  0.09523810  0.06593407  0.09523810
## 175 -0.17582418  0.00000000  0.38095238  0.26373626  0.20000000
## 176  0.13333333 -0.13333333  0.56250000  0.52380952  0.28571429
## 177  0.20879121  0.06666667  0.21568627 -0.16666667  0.43750000
## 178  0.57894737 -0.16666667 -0.03296703 -0.50000000 -0.25274725
## 179  0.26666667 -0.18750000  0.38095238  0.26666667  0.38095238
## 180  0.20879121  0.43750000  0.20879121  0.20879121  0.33333333
## 181  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 182 -0.37500000 -0.19047619  0.22222222  0.03921569  0.77777778
## 183  0.83333333  0.78947368  0.27777778 -0.27777778  0.31250000
## 184  0.20000000  0.62500000  0.27777778  0.20000000 -0.06666667
## 185  0.20000000  0.09803922 -0.33333333  0.31250000  0.31250000
## 186  0.33333333  0.16666667  0.14285714  0.20000000  0.16666667
## 187  0.27777778  0.31250000  0.31250000  0.11904762 -0.33333333
## 188  0.12500000  0.43750000  0.02380952  0.12500000  0.43750000
## 189  0.00000000  0.49019608 -0.26315789  0.27777778  0.00000000
```

```
## 190  0.12500000  0.00000000  0.31372549 -0.18750000  0.00000000
## 191  0.11904762  0.00000000  0.20000000  0.49019608  0.20000000
## 192  0.12500000 -0.20000000 -0.04166667  0.60000000  0.21568627
## 193 -0.05555556  0.33333333  0.14285714 -0.05555556 -0.05263158
## 194  0.22222222  0.73684211  0.22222222 -0.35294118  0.22222222
## 195  0.60000000  0.69047619 -0.02380952  0.60000000 -0.12500000
## 196  0.20000000 -0.06666667 -0.07142857 -0.05555556 -0.06666667
## 197  0.38095238  0.79166667  0.38095238  0.70588235  0.11111111
## 198  0.94736842  0.27450980 -0.11764706 -0.10526316  0.27450980
## 199 -0.13333333 -0.12500000 -0.12500000  0.27450980  0.27450980
## 200  0.09523810 -0.11764706  0.18750000  0.27450980  0.40000000
## 201  0.50000000 -0.11111111 -0.11764706  0.27450980  0.18750000
## 202  0.53333333  0.75000000  0.80000000  0.53333333  0.53333333
## 203 -0.04761905  0.13186813 -0.04761905 -0.08791209 -0.22222222
## 204  0.26666667  0.37500000  0.06250000  0.54901961  0.06250000
## 205  0.89473684  0.38888889  0.21568627  0.21568627  0.38888889
## 206  0.13333333 -0.11764706 -0.10526316 -0.13333333  0.06593407
## 207  0.28571429  0.40000000 -0.31578947  0.82352941  0.73684211
## 208  0.59523810 -0.27777778  0.49019608  0.83333333  0.27777778
## 209 -0.13333333 -0.33333333  0.77777778  0.25000000  0.43137255
## 210  0.14285714  0.16666667  0.33333333  0.25000000  0.50000000
## 211  0.44444444  0.27450980  0.44444444  0.18750000  0.40000000
## 212  0.37500000  0.33333333  0.15686275  0.37500000  0.37500000
## 213 -0.27777778 -0.26315789  0.27777778  0.27777778  0.83333333
## 214  0.12500000  0.33333333  0.50000000  0.43750000  0.43750000
## 215  0.11904762  0.31250000  0.09803922 -0.26315789  0.31250000
## 216 -0.22222222  0.00000000  0.29166667  0.35164835  0.84210526
## 217  0.00000000  0.24242424  0.06250000 -0.23529412  0.26666667
## 218  0.46666667  0.62500000  0.62500000  0.49450549  0.46666667
## 219  0.27777778  0.27472527  0.46666667  0.49019608  0.20000000
## 220  0.35714286  0.20000000  0.78947368  0.09803922  0.59523810
## 221  0.38888889  0.89473684  0.38888889  0.37500000  0.43750000
## 222  0.06666667  0.50000000  0.94444444  0.89473684  0.37500000
## 223 -0.05555556         NaN -0.05555556  0.33333333 -0.05263158
## 224 -0.21052632  0.68750000  0.19047619 -0.22222222  0.06250000
## 225  0.68750000  0.37500000  0.54901961  0.84210526  0.15686275
## 226  0.52380952  0.52380952  0.93333333  0.43137255  0.87500000
## 227 -0.06250000  0.56250000  0.22222222  0.82352941  0.19780220
## 228 -0.05555556 -0.07142857 -0.05555556  0.50000000  0.16666667
## 229 -0.06250000 -0.05882353  0.25000000 -0.05882353  0.25000000
## 230  0.15686275  0.15686275  0.37500000  0.84210526  0.33333333
## 231  0.78947368         NaN         NaN  0.78947368  0.78947368
## 232  0.46666667  0.31250000  0.88235294  0.35714286  0.88235294
## 233  0.33333333  0.37500000  0.00000000  0.37500000  0.33333333
## 234  0.21568627  0.02380952  0.12500000 -0.17647059  0.38888889
## 235  0.25000000 -0.05882353 -0.05882353 -0.05882353 -0.06250000
## 236  0.38888889  0.38888889  0.20879121  0.06666667  0.26190476
## 237 -0.11764706  0.27450980 -0.11764706  0.13333333 -0.14285714
## 238 -0.07142857 -0.05882353 -0.06250000 -0.05882353 -0.07692308
## 239  0.12500000 -0.17647059 -0.17647059 -0.17647059  0.12500000
## 240  0.27450980 -0.12500000  0.18750000  0.13333333  0.40000000
## 241 -0.07142857  0.20000000  0.16666667 -0.07142857 -0.06666667
## 242 -0.05882353 -0.05882353 -0.06250000 -0.05263158  0.33333333
## 243  0.21568627  0.21568627  0.94444444         NaN  0.21568627
## 244  0.60784314  0.42857143  0.94444444 -0.15789474         NaN
## 245  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 246         NaN -0.05882353  0.25000000  0.20000000 -0.05882353
## 247  0.20000000  0.20000000 -0.05555556 -0.05555556 -0.05263158
```

```
## 248  0.42857143  0.38888889  0.50000000  0.38888889  0.43750000
## 249  0.15686275  0.54901961  0.68750000  0.88888889  0.37500000
## 250  0.75000000  0.89473684  0.75000000  0.21568627  0.60784314
## 251  0.43750000  0.38888889 -0.16666667 -0.18750000  0.43750000
## 252  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 253 -0.06250000  0.25000000 -0.05263158 -0.05555556 -0.05882353
## 254  0.50000000  0.50000000 -0.05882353  0.33333333 -0.05555556
## 255  0.27450980  0.27450980  0.50000000  0.44444444  0.44444444
## 256  0.40000000  0.50000000  0.66666667  0.66666667  0.40000000
## 257  0.54901961  0.06250000  0.06250000  0.15686275  0.06250000
## 258 -0.10526316 -0.10526316 -0.11764706  0.40000000  0.40000000
## 259 -0.11764706  0.33333333  0.33333333  0.33333333  0.27450980
## 260 -0.11111111  0.44444444  0.44444444  0.09523810 -0.11111111
## 261  0.18750000 -0.12500000  0.27450980 -0.13333333 -0.11764706
## 262  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 263  0.00000000  0.00000000  0.00000000  0.00000000  0.00000000
## 264  0.33333333 -0.05555556  0.14285714 -0.05555556  0.16666667
## 265  0.33333333  0.60000000  0.38888889  0.38888889  0.75000000
## 266 -0.05882353 -0.05263158  0.20000000  0.25000000  0.50000000
## 267  0.94736842  0.66666667  0.66666667  0.50000000  0.40000000
## 268  0.40000000  0.18750000  1.00000000  0.44444444  0.44444444
## 269  0.50000000  0.20000000  0.50000000  0.25000000  0.50000000
## 270  0.25000000  0.33333333  0.50000000  0.25000000  0.33333333
## 271  0.25000000  0.33333333  0.16666667 -0.06250000  0.20000000
## 272  0.25000000  0.20000000         NaN  0.25000000  0.16666667
## 273 -0.11111111 -0.10526316 -0.12500000  0.13333333  0.50000000
## 274  0.33333333  0.25000000  0.50000000  0.33333333  0.50000000
## 275  0.44444444  0.09523810  0.50000000  0.40000000  0.40000000
## 276  0.26262626  0.06060606  0.08333333  0.20000000  0.26262626
## 277  0.14285714  0.58333333 -0.18750000 -0.18750000  0.48351648
## 278  0.50000000  0.43434343 -0.17171717  0.10000000  0.30000000
## 279  0.12087912  0.33333333  0.45238095  0.57575758  0.21428571
## 280  0.13725490 -0.07142857  0.50000000  0.50000000  0.41414141
## 281  0.20000000  0.50000000  0.33333333  0.50000000  0.25000000
## 282 -0.12500000  0.50000000  0.21428571  0.06666667 -0.20000000
## 283  0.18750000  0.18750000  0.18750000 -0.10526316         NaN
## 284 -0.35294118  0.25000000  0.13333333 -0.37500000  0.04761905
## 285  0.12500000  0.21568627  0.02380952  0.21568627  0.26190476
## 286 -0.17647059  0.38888889  0.38888889  0.12500000 -0.17647059
## 287  0.49019608  0.49019608  0.49019608  0.59523810  0.46666667
## 288 -0.16666667  0.38888889 -0.16666667  0.21568627         NaN
## 289  0.84210526  0.54901961  0.42857143  0.37500000  0.94117647
## 290 -0.10526316 -0.13333333  0.09523810  0.40000000  0.13333333
## 291  0.21568627  0.33333333 -0.15789474  0.38888889 -0.16666667
## 292  0.89473684  0.12500000  0.12500000  0.38888889  0.38888889
## 293 -0.23529412  0.35164835  0.53333333  0.42857143  0.53333333
## 294  0.19047619  0.54901961  0.54901961  0.54901961  0.37500000
## 295 -0.23529412         NaN  0.26666667  0.88888889  1.00000000
## 296  0.12500000  0.89473684  0.60784314  0.06666667  0.33333333
## 297  0.38888889  0.21568627  0.33333333  0.12500000  0.02380952
## 298  0.00000000  0.10101010  0.76923077  0.60000000  0.41666667
## 299  0.44444444  0.66666667  0.50000000  0.66666667  0.44444444
## 300 -0.11111111  0.27450980 -0.11111111  0.44444444  0.44444444
##
## $similarity
##             1         2         3         4         5
## 1   0.2857143 0.0000000 0.0000000 0.2500000 0.3333333
## 2   0.5714286 0.6666667 0.4000000 0.5000000 0.4285714
```

```
## 3   0.7142857 0.5555556 0.6666667 0.7142857 0.4285714
## 4   0.6153846 0.4285714 0.6153846 0.5714286 0.5000000
## 5   0.3636364 0.3333333 0.3333333 0.3076923 0.3333333
## 6   0.8421053 0.8000000 0.8888889 0.8421053 0.8695652
## 7   0.4615385 0.5333333 0.5714286 0.5333333 0.7142857
## 8   0.5000000 0.6250000 0.5333333 0.5000000 0.5263158
## 9   0.6666667 0.7500000 0.7777778 0.2857143 0.6250000
## 10  0.6250000 0.4285714 0.4615385 0.6250000 0.6666667
## 11  0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 12  0.8695652 0.9166667 0.8800000 0.8000000 0.9090909
## 13  0.7826087 0.7000000 0.7368421 0.8000000 0.8181818
## 14  0.6666667 0.7500000 0.5882353 0.6315789 0.6666667
## 15  0.7200000 0.8571429 0.7272727 0.6000000 0.7272727
## 16  0.8181818 0.7272727 0.7000000 0.7272727 0.8333333
## 17  0.7500000 0.6250000 0.5555556 0.7692308 0.5333333
## 18  0.5000000 0.7777778 0.6666667 0.8235294 0.7058824
## 19  0.8461538 0.8461538 0.9285714 0.7500000 0.9285714
## 20  0.7368421 0.5882353 0.6315789 0.6666667 0.7058824
## 21  0.6315789 0.7000000 0.7368421 0.6666667 0.6315789
## 22  0.6363636 0.7368421 0.5263158 0.6315789 0.6315789
## 23  0.5454545 0.4615385 0.5000000 0.5000000 0.4285714
## 24  0.6315789 0.6666667 0.6666667 0.7777778 0.6666667
## 25  0.4615385 0.4000000 0.3636364 0.1818182 0.6000000
## 26  0.6666667 0.7272727 0.4285714 0.6153846 0.3333333
## 27  0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 28  0.4285714 0.6666667 0.3750000 0.5000000 0.6666667
## 29  0.4000000 0.4615385 0.5714286 0.5714286 0.6250000
## 30  0.6315789 0.6666667 0.5882353 0.5882353 0.6250000
## 31  0.6666667 0.7777778 0.6666667 0.7826087 0.5000000
## 32  0.8181818 0.8333333 0.8571429 0.6666667 0.8421053
## 33  0.4000000 0.6666667 0.8235294 0.6315789 0.4615385
## 34  0.7500000 0.7058824 0.7000000 0.7058824 0.7777778
## 35  0.7777778 0.7368421 0.9090909 0.8888889 0.9000000
## 36  0.8000000 0.5000000 0.7272727 0.6956522 0.7368421
## 37  0.6363636 0.6956522 0.7500000 0.7826087 0.6956522
## 38  0.3529412 0.7000000 0.3750000 0.4705882 0.3529412
## 39  0.6000000 0.7000000 0.5263158 0.4444444 0.4444444
## 40  0.7619048 0.7619048 0.7619048 0.8571429 0.9523810
## 41  0.5882353 0.9000000 0.7777778 0.8571429 0.9523810
## 42  0.6666667 0.6250000 0.5555556 0.9000000 0.2500000
## 43  0.7777778 0.7500000 0.4000000 0.5882353 0.5333333
## 44  0.7619048 0.6250000 0.5882353 0.5555556 0.3750000
## 45  0.7777778 0.7619048 0.7777778 0.7619048 0.7058824
## 46  0.5714286 0.4285714 0.4285714 0.9411765 0.7368421
## 47  0.5714286 0.5333333 0.5714286 0.5454545 0.5714286
## 48  0.6315789 0.4705882 0.5333333 0.5454545 0.5555556
## 49  0.5000000 0.6666667 0.6250000 0.5882353 0.4615385
## 50  0.8571429 0.8695652 0.7368421 0.6363636 0.7000000
## 51  0.8000000 0.8000000 0.7619048 0.5555556 0.7058824
## 52  0.5333333 0.6666667 0.5000000 0.6250000 0.6153846
## 53  0.6250000 0.6666667 0.7777778 0.5333333 0.6000000
## 54  0.7000000 0.5263158 0.6666667 0.8695652 0.8333333
## 55  0.7142857 0.5454545 0.5333333 0.6666667 0.6153846
## 56  0.6666667 0.5714286 0.5000000 0.4000000 0.1666667
## 57  0.7619048 0.5263158 0.3529412 0.6666667 0.7500000
## 58  0.7058824 0.7058824 0.8888889 0.7777778 0.7368421
## 59  0.7000000 0.7826087 0.8695652 0.8333333 0.7619048
## 60  0.6666667 0.4615385 0.5000000 0.6153846 0.4615385
```

```
## 61  0.5555556 0.7619048 0.7619048 0.8181818 0.5555556
## 62  0.6250000 0.7500000 0.5333333 0.6666667 0.7619048
## 63  0.5333333 0.4615385 0.6250000 0.5714286 0.6250000
## 64  0.6153846 0.7692308 0.6000000 0.4285714 0.3636364
## 65  0.5000000 0.6250000 0.3076923 0.4285714 0.6315789
## 66  0.5882353 0.5882353 0.5882353 0.3750000 0.6250000
## 67  0.4444444 0.5000000 0.3529412 0.5000000 0.4444444
## 68  0.5333333 0.7619048 0.8421053 0.7000000 0.5263158
## 69  0.4705882 0.1333333 0.3750000 0.5333333 0.5000000
## 70  0.3529412 0.7000000 0.6666667 0.7619048 0.7000000
## 71  0.5882353 0.5000000 0.2500000 0.7142857 0.4615385
## 72  0.8000000 0.7272727 0.8421053 0.6250000 0.4705882
## 73  0.5714286 0.7826087 0.7000000 0.6315789 0.7272727
## 74  0.6666667 0.6666667 0.5555556 0.6666667 0.5333333
## 75  0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 76  0.8800000 0.8333333 0.7272727 0.7826087 0.8333333
## 77  0.8000000 0.7500000 0.7619048 0.8181818 0.6666667
## 78  0.5555556 0.7368421 0.5217391 0.4000000 0.8000000
## 79  0.2500000 0.2222222 0.2222222 0.1818182 0.5714286
## 80  0.5714286 0.4285714 0.4000000 0.3750000 0.4000000
## 81  0.6666667 0.5263158 0.7272727 0.8000000 0.5000000
## 82  0.2857143 0.6666667 0.4705882 0.1428571 0.4615385
## 83  0.6000000 0.4705882 0.7619048 0.5882353 0.8000000
## 84  0.0000000 0.0000000 0.2222222 0.0000000 0.0000000
## 85  0.4000000 0.1818182 0.4444444 0.0000000 0.4444444
## 86  0.3333333 0.3076923 0.5714286 0.4285714 0.4705882
## 87  0.5000000 0.5000000 0.6315789 0.7368421 0.6000000
## 88  0.6666667 0.4000000 0.6666667 0.6666667 0.6666667
## 89  0.4615385 0.5000000 0.4615385 0.4000000 0.5000000
## 90  0.6153846 0.5000000 0.4615385 0.0000000 0.2666667
## 91  0.3750000 0.2857143 0.3076923 0.5714286 0.5882353
## 92  0.1538462 0.7272727 0.6315789 0.7058824 0.5000000
## 93  0.7000000 0.5263158 0.8181818 0.7272727 0.6666667
## 94  0.6250000 0.4705882 0.3750000 0.5882353 0.6666667
## 95  0.5000000 0.5714286 0.6666667 0.8181818 0.5555556
## 96  0.4285714 0.6666667 0.3333333 0.5714286 0.5882353
## 97  0.5333333 0.6250000 0.3333333 0.5000000 0.6153846
## 98  0.1428571 0.6666667 0.4705882 0.3076923 0.7777778
## 99  0.2500000 0.4000000 0.5000000 0.1538462 0.3529412
## 100 0.4615385 0.3076923 0.4615385 0.4285714 0.5000000
## 101 0.6666667 0.8000000 0.5000000 0.5000000 0.2857143
## 102 0.7142857 0.4615385 0.3636364 0.7142857 0.4000000
## 103 0.7058824 0.6666667 0.3750000 0.6250000 0.4000000
## 104 0.5714286 0.4000000 0.4705882 0.5714286 0.7619048
## 105 0.2222222 0.6666667 0.5333333 0.3636364 0.3636364
## 106 0.4000000 0.4444444 0.5454545 0.0000000 0.0000000
## 107 0.2500000 0.0000000 0.3076923 0.3333333 0.4285714
## 108 0.7058824 0.5333333 0.4285714 0.5000000 0.5263158
## 109 0.6086957 0.4444444 0.5000000 0.6000000 0.5000000
## 110 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 111 0.3076923 0.5333333 0.3333333 0.5882353 0.5714286
## 112 0.3333333 0.2857143 0.3333333 0.4285714 0.5333333
## 113 0.3076923 0.3333333 0.5555556 0.4000000 0.3333333
## 114 0.2000000 0.0000000 0.3076923 0.2000000 0.4444444
## 115 0.6250000 0.5333333 0.2666667 0.5714286 0.6250000
## 116 0.0000000 0.2222222 0.2500000 0.0000000 0.0000000
## 117 0.4000000 0.4705882 0.3076923 0.5882353 0.2857143
## 118 0.5263158 0.5714286 0.4210526 0.6000000 0.5555556
```

```
## 119 0.3333333 0.2500000 0.3636364 0.2857143 0.2857143
## 120 0.2222222 0.2857143 0.0000000 0.1818182 0.0000000
## 121 0.4000000 0.2222222 0.2666667 0.4000000 0.3636364
## 122 0.7058824 0.3750000 0.6666667 0.6000000 0.6000000
## 123 0.1538462 0.1666667 0.3076923 0.4000000 0.3076923
## 124 0.2857143 0.4444444 0.4000000 0.4000000 0.2000000
## 125 0.0000000 0.0000000 0.2500000 0.0000000 0.2857143
## 126 0.1538462 0.6666667 0.6666667 0.4285714 0.1818182
## 127 0.5333333 0.4285714 0.2857143 0.5000000 0.4000000
## 128 0.5555556 0.5555556 0.6250000 0.7619048 0.5000000
## 129 0.3076923 0.5333333 0.3333333 0.4285714 0.4285714
## 130 0.7368421 0.6666667 0.6666667 0.7058824 0.5555556
## 131 0.2857143 0.4285714 0.4444444 0.5000000 0.5555556
## 132 0.5555556 0.2857143 0.4615385 0.4285714 0.2666667
## 133 0.4444444 0.2000000 0.2500000 0.7500000 0.4615385
## 134 0.5000000 0.5000000 0.3076923 0.3636364 0.4285714
## 135 0.3529412 0.3333333 0.4210526 0.6315789 0.1428571
## 136 0.4615385 0.4705882 0.5000000 0.5555556 0.3076923
## 137 0.4285714 0.4705882 0.7058824 0.4000000 0.4285714
## 138 0.5333333 0.3333333 0.3333333 0.4285714 0.5000000
## 139 0.2000000 0.0000000 0.2000000 0.0000000 0.4000000
## 140 0.0000000 0.2500000 0.3333333 0.3333333 0.4444444
## 141 0.5714286 0.5000000 0.5000000 0.5454545 0.5000000
## 142 0.4000000 0.1818182 0.5714286 0.4615385 0.5454545
## 143 0.5000000 0.3636364 0.2222222 0.0000000 0.2500000
## 144 0.6666667 0.3076923 0.3333333 0.2857143 0.4615385
## 145 0.2000000 0.3750000 0.3333333 0.6666667 0.5454545
## 146 0.0000000 0.3636364 0.0000000 0.6000000 0.3333333
## 147 0.3333333 0.2857143 0.0000000 0.5000000 0.2000000
## 148 0.3076923 0.3636364 0.1818182 0.4285714 0.3076923
## 149 0.5714286 0.3076923 0.0000000 0.1666667 0.3750000
## 150 0.4000000 0.3333333 0.3333333 0.4000000 0.3333333
## 151 0.5454545 0.4000000 0.5454545 0.6666667 0.0000000
## 152 0.4444444 0.2500000 0.4000000 0.2000000 0.7272727
## 153 0.4285714 0.4285714 0.8000000 0.4285714 0.4000000
## 154 0.0000000 0.2500000 0.0000000 0.5714286 0.0000000
## 155 0.4000000 0.2857143 0.3636364 0.4444444 0.2500000
## 156 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 157 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 158 0.4285714 0.2857143 0.5333333 0.3076923 0.3750000
## 159 0.5333333 0.5000000 0.3076923 0.1818182 0.4615385
## 160 0.0000000 0.0000000 0.4000000 0.0000000 0.5714286
## 161 0.5000000 0.0000000 0.5714286 0.5454545 0.3636364
## 162 0.6666667 0.4444444 0.3636364 0.2500000 0.4444444
## 163 0.2500000 0.3333333 0.4444444 0.2857143 0.6000000
## 164 0.5000000 0.2000000 0.5454545 0.2857143 0.3333333
## 165 0.2857143 0.7500000 0.7500000 0.0000000 0.5000000
## 166 0.0000000 0.3636364 0.0000000 0.2857143 0.2000000
## 167 0.5000000 0.4615385 0.2000000 0.5000000 0.1818182
## 168 0.2500000 0.0000000 0.0000000 0.2500000 0.3333333
## 169 0.0000000 0.3333333 0.0000000 0.0000000 0.0000000
## 170 0.5454545 0.2222222 0.3636364 0.3636364 0.4444444
## 171 0.4000000 0.0000000 0.2500000 0.0000000 0.5000000
## 172 0.4000000 0.3333333 0.1818182 0.4000000 0.4000000
## 173 0.3333333 0.5333333 0.3750000 0.5000000 0.4705882
## 174 0.0000000 0.2857143 0.2500000 0.2222222 0.2500000
## 175 0.2666667 0.4444444 0.5714286 0.5333333 0.5555556
## 176 0.3636364 0.1818182 0.6000000 0.6666667 0.5000000
```

```
## 177 0.4000000 0.2500000 0.3333333 0.0000000 0.5714286
## 178 0.2000000 0.2666667 0.3750000 0.0000000 0.2500000
## 179 0.4615385 0.1666667 0.5714286 0.4615385 0.5714286
## 180 0.4000000 0.5714286 0.4000000 0.4000000 0.5000000
## 181 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 182 0.0000000 0.1666667 0.2500000 0.2222222 0.5000000
## 183 0.5714286 0.3333333 0.2857143 0.0000000 0.4444444
## 184 0.4000000 0.6666667 0.2857143 0.4000000 0.2000000
## 185 0.4000000 0.2500000 0.0000000 0.4444444 0.4444444
## 186 0.5000000 0.2857143 0.2500000 0.3333333 0.2857143
## 187 0.2857143 0.4444444 0.4444444 0.3636364 0.0000000
## 188 0.2857143 0.5714286 0.2222222 0.2857143 0.5714286
## 189 0.2222222 0.5000000 0.0000000 0.2857143 0.2222222
## 190 0.3333333 0.3076923 0.3636364 0.1666667 0.3076923
## 191 0.3636364 0.2222222 0.4000000 0.5000000 0.4000000
## 192 0.2857143 0.0000000 0.1818182 0.7500000 0.3333333
## 193 0.0000000 0.5000000 0.2500000 0.0000000 0.0000000
## 194 0.2500000 0.2857143 0.2500000 0.0000000 0.2500000
## 195 0.6666667 0.7692308 0.3076923 0.6666667 0.1818182
## 196 0.3333333 0.0000000 0.0000000 0.0000000 0.0000000
## 197 0.5714286 0.8750000 0.5714286 0.5454545 0.2000000
## 198 0.6666667 0.4000000 0.0000000 0.0000000 0.4000000
## 199 0.0000000 0.0000000 0.0000000 0.4000000 0.4000000
## 200 0.2500000 0.0000000 0.3333333 0.4000000 0.5714286
## 201 0.6666667 0.0000000 0.0000000 0.4000000 0.3333333
## 202 0.6153846 0.6666667 0.7692308 0.6153846 0.6153846
## 203 0.2000000 0.3636364 0.2000000 0.1818182 0.0000000
## 204 0.4444444 0.5000000 0.2500000 0.5714286 0.2500000
## 205 0.5000000 0.4000000 0.3333333 0.3333333 0.4000000
## 206 0.2857143 0.0000000 0.0000000 0.0000000 0.2222222
## 207 0.5000000 0.5454545 0.0000000 0.6666667 0.2857143
## 208 0.7272727 0.0000000 0.5000000 0.5714286 0.2857143
## 209 0.1818182 0.0000000 0.5000000 0.4000000 0.4444444
## 210 0.2500000 0.2857143 0.5000000 0.4000000 0.6666667
## 211 0.5000000 0.4000000 0.5000000 0.3333333 0.5714286
## 212 0.5000000 0.3333333 0.2857143 0.5000000 0.5000000
## 213 0.0000000 0.0000000 0.2857143 0.2857143 0.5714286
## 214 0.2857143 0.5000000 0.6666667 0.5714286 0.5714286
## 215 0.3636364 0.4444444 0.2500000 0.0000000 0.4444444
## 216 0.0000000 0.2222222 0.5000000 0.5454545 0.4000000
## 217 0.2222222 0.4615385 0.2500000 0.0000000 0.4444444
## 218 0.6000000 0.6666667 0.6666667 0.6666667 0.6000000
## 219 0.2857143 0.5000000 0.6000000 0.5000000 0.4000000
## 220 0.5454545 0.4000000 0.3333333 0.2500000 0.7272727
## 221 0.4000000 0.5000000 0.4000000 0.5454545 0.5714286
## 222 0.2500000 0.6666667 0.8000000 0.5000000 0.5454545
## 223 0.0000000 0.0000000 0.0000000 0.5000000 0.0000000
## 224 0.0000000 0.7500000 0.4000000 0.0000000 0.2500000
## 225 0.7500000 0.5000000 0.5714286 0.4000000 0.2857143
## 226 0.6666667 0.6666667 0.9090909 0.4444444 0.8000000
## 227 0.2000000 0.6000000 0.2500000 0.6666667 0.4615385
## 228 0.0000000 0.0000000 0.0000000 0.6666667 0.2857143
## 229 0.0000000 0.0000000 0.4000000 0.0000000 0.4000000
## 230 0.2857143 0.2857143 0.5000000 0.4000000 0.3333333
## 231 0.3333333 0.0000000 0.0000000 0.3333333 0.3333333
## 232 0.6000000 0.4444444 0.7500000 0.5454545 0.7500000
## 233 0.3333333 0.5000000 0.2222222 0.5000000 0.3333333
## 234 0.3333333 0.2222222 0.2857143 0.0000000 0.4000000
```

```
## 235 0.4000000 0.0000000 0.0000000 0.0000000 0.0000000
## 236 0.4000000 0.4000000 0.4000000 0.2500000 0.4444444
## 237 0.0000000 0.4000000 0.0000000 0.2857143 0.0000000
## 238 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 239 0.2857143 0.0000000 0.0000000 0.0000000 0.2857143
## 240 0.4000000 0.0000000 0.3333333 0.2857143 0.5714286
## 241 0.0000000 0.3333333 0.2857143 0.0000000 0.0000000
## 242 0.0000000 0.0000000 0.0000000 0.0000000 0.5000000
## 243 0.3333333 0.3333333 0.8000000 0.0000000 0.3333333
## 244 0.6666667 0.6000000 0.8000000 0.0000000 0.0000000
## 245 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 246 0.0000000 0.0000000 0.4000000 0.3333333 0.0000000
## 247 0.3333333 0.3333333 0.0000000 0.0000000 0.0000000
## 248 0.6000000 0.4000000 0.6666667 0.4000000 0.5714286
## 249 0.2857143 0.5714286 0.7500000 0.6666667 0.5000000
## 250 0.8571429 0.5000000 0.8571429 0.3333333 0.6666667
## 251 0.5714286 0.4000000 0.0000000 0.0000000 0.5714286
## 252 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 253 0.0000000 0.4000000 0.0000000 0.0000000 0.0000000
## 254 0.6666667 0.6666667 0.0000000 0.5000000 0.0000000
## 255 0.4000000 0.4000000 0.6666667 0.5000000 0.5000000
## 256 0.5714286 0.6666667 0.8000000 0.8000000 0.5714286
## 257 0.5714286 0.2500000 0.2500000 0.2857143 0.2500000
## 258 0.0000000 0.0000000 0.0000000 0.5714286 0.5714286
## 259 0.0000000 0.5000000 0.5000000 0.5000000 0.4000000
## 260 0.0000000 0.5000000 0.5000000 0.2500000 0.0000000
## 261 0.3333333 0.0000000 0.4000000 0.0000000 0.0000000
## 262 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 263 0.0000000 0.0000000 0.0000000 0.0000000 0.0000000
## 264 0.5000000 0.0000000 0.2500000 0.0000000 0.2857143
## 265 0.5000000 0.7500000 0.4000000 0.4000000 0.8571429
## 266 0.0000000 0.0000000 0.3333333 0.4000000 0.6666667
## 267 0.6666667 0.8000000 0.8000000 0.6666667 0.5714286
## 268 0.5714286 0.3333333 1.0000000 0.5000000 0.5000000
## 269 0.6666667 0.3333333 0.6666667 0.4000000 0.6666667
## 270 0.4000000 0.5000000 0.6666667 0.4000000 0.5000000
## 271 0.4000000 0.5000000 0.2857143 0.0000000 0.3333333
## 272 0.4000000 0.3333333 0.0000000 0.4000000 0.2857143
## 273 0.0000000 0.0000000 0.0000000 0.2857143 0.6666667
## 274 0.5000000 0.4000000 0.6666667 0.5000000 0.6666667
## 275 0.5000000 0.2500000 0.6666667 0.5714286 0.5714286
## 276 0.5333333 0.4000000 0.4444444 0.5000000 0.5333333
## 277 0.4285714 0.7500000 0.1666667 0.1666667 0.6666667
## 278 0.7058824 0.6666667 0.3333333 0.4705882 0.5882353
## 279 0.4285714 0.5000000 0.6153846 0.7500000 0.4615385
## 280 0.2857143 0.3529412 0.3076923 0.3076923 0.7000000
## 281 0.3333333 0.6666667 0.5000000 0.6666667 0.4000000
## 282 0.1818182 0.5454545 0.4615385 0.3333333 0.1666667
## 283 0.3333333 0.3333333 0.3333333 0.0000000 0.0000000
## 284 0.0000000 0.4000000 0.3636364 0.0000000 0.3333333
## 285 0.2857143 0.3333333 0.2222222 0.3333333 0.4444444
## 286 0.0000000 0.4000000 0.4000000 0.2857143 0.0000000
## 287 0.5000000 0.5000000 0.5000000 0.7272727 0.6000000
## 288 0.0000000 0.4000000 0.0000000 0.3333333 0.0000000
## 289 0.4000000 0.5714286 0.6000000 0.5000000 0.8571429
## 290 0.0000000 0.0000000 0.2500000 0.5714286 0.2857143
## 291 0.3333333 0.5000000 0.0000000 0.4000000 0.0000000
## 292 0.5000000 0.2857143 0.2857143 0.4000000 0.4000000
```

```
## 293 0.0000000 0.5454545 0.6666667 0.6000000 0.6666667
## 294 0.4000000 0.5714286 0.5714286 0.5714286 0.5000000
## 295 0.0000000 0.0000000 0.4444444 0.6666667 1.0000000
## 296 0.2857143 0.5000000 0.6666667 0.2500000 0.5000000
## 297 0.4000000 0.3333333 0.5000000 0.2857143 0.2222222
## 298 0.3750000 0.5714286 0.8695652 0.8000000 0.6666667
## 299 0.5000000 0.8000000 0.6666667 0.8000000 0.5000000
## 300 0.0000000 0.4000000 0.0000000 0.5000000 0.5000000
##
## $Jaccard
##              1          2          3          4          5
## 1   0.16666667 0.00000000 0.00000000 0.14285714 0.20000000
## 2   0.40000000 0.50000000 0.25000000 0.33333333 0.27272727
## 3   0.55555556 0.38461538 0.50000000 0.55555556 0.27272727
## 4   0.44444444 0.27272727 0.44444444 0.40000000 0.33333333
## 5   0.22222222 0.20000000 0.20000000 0.18181818 0.20000000
## 6   0.72727273 0.66666667 0.80000000 0.72727273 0.76923077
## 7   0.30000000 0.36363636 0.40000000 0.36363636 0.55555556
## 8   0.33333333 0.45454545 0.36363636 0.33333333 0.35714286
## 9   0.50000000 0.60000000 0.63636364 0.16666667 0.45454545
## 10  0.45454545 0.27272727 0.30000000 0.45454545 0.50000000
## 11  0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 12  0.76923077 0.84615385 0.78571429 0.66666667 0.83333333
## 13  0.64285714 0.53846154 0.58333333 0.66666667 0.69230769
## 14  0.50000000 0.60000000 0.41666667 0.46153846 0.50000000
## 15  0.56250000 0.75000000 0.57142857 0.42857143 0.57142857
## 16  0.69230769 0.57142857 0.53846154 0.57142857 0.71428571
## 17  0.60000000 0.45454545 0.38461538 0.62500000 0.36363636
## 18  0.33333333 0.63636364 0.50000000 0.70000000 0.54545455
## 19  0.73333333 0.73333333 0.86666667 0.60000000 0.86666667
## 20  0.58333333 0.41666667 0.46153846 0.50000000 0.54545455
## 21  0.46153846 0.53846154 0.58333333 0.50000000 0.46153846
## 22  0.46666667 0.58333333 0.35714286 0.46153846 0.46153846
## 23  0.37500000 0.30000000 0.33333333 0.33333333 0.27272727
## 24  0.46153846 0.50000000 0.50000000 0.63636364 0.50000000
## 25  0.30000000 0.25000000 0.22222222 0.10000000 0.42857143
## 26  0.50000000 0.57142857 0.27272727 0.44444444 0.20000000
## 27  0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 28  0.27272727 0.50000000 0.23076923 0.33333333 0.50000000
## 29  0.25000000 0.30000000 0.40000000 0.40000000 0.45454545
## 30  0.46153846 0.50000000 0.41666667 0.41666667 0.45454545
## 31  0.50000000 0.63636364 0.50000000 0.64285714 0.33333333
## 32  0.69230769 0.71428571 0.75000000 0.50000000 0.72727273
## 33  0.25000000 0.50000000 0.70000000 0.46153846 0.30000000
## 34  0.60000000 0.54545455 0.53846154 0.54545455 0.63636364
## 35  0.63636364 0.58333333 0.83333333 0.80000000 0.81818182
## 36  0.66666667 0.33333333 0.57142857 0.53333333 0.58333333
## 37  0.46666667 0.53333333 0.60000000 0.64285714 0.53333333
## 38  0.21428571 0.53846154 0.23076923 0.30769231 0.21428571
## 39  0.42857143 0.53846154 0.35714286 0.28571429 0.28571429
## 40  0.61538462 0.61538462 0.61538462 0.75000000 0.90909091
## 41  0.41666667 0.81818182 0.63636364 0.75000000 0.90909091
## 42  0.50000000 0.45454545 0.38461538 0.81818182 0.14285714
## 43  0.63636364 0.60000000 0.25000000 0.41666667 0.36363636
## 44  0.61538462 0.45454545 0.41666667 0.38461538 0.23076923
## 45  0.63636364 0.61538462 0.63636364 0.61538462 0.54545455
## 46  0.40000000 0.27272727 0.27272727 0.88888889 0.58333333
## 47  0.40000000 0.36363636 0.40000000 0.37500000 0.40000000
```

```
## 48  0.46153846 0.30769231 0.36363636 0.37500000 0.38461538
## 49  0.33333333 0.50000000 0.45454545 0.41666667 0.30000000
## 50  0.75000000 0.76923077 0.58333333 0.46666667 0.53846154
## 51  0.66666667 0.66666667 0.61538462 0.38461538 0.54545455
## 52  0.36363636 0.50000000 0.33333333 0.45454545 0.44444444
## 53  0.45454545 0.50000000 0.63636364 0.36363636 0.42857143
## 54  0.53846154 0.35714286 0.50000000 0.76923077 0.71428571
## 55  0.55555556 0.37500000 0.36363636 0.50000000 0.44444444
## 56  0.50000000 0.40000000 0.33333333 0.25000000 0.09090909
## 57  0.61538462 0.35714286 0.21428571 0.50000000 0.60000000
## 58  0.54545455 0.54545455 0.80000000 0.63636364 0.58333333
## 59  0.53846154 0.64285714 0.76923077 0.71428571 0.61538462
## 60  0.50000000 0.30000000 0.33333333 0.44444444 0.30000000
## 61  0.38461538 0.61538462 0.61538462 0.69230769 0.38461538
## 62  0.45454545 0.60000000 0.36363636 0.50000000 0.61538462
## 63  0.36363636 0.30000000 0.45454545 0.40000000 0.45454545
## 64  0.44444444 0.62500000 0.42857143 0.27272727 0.22222222
## 65  0.33333333 0.45454545 0.18181818 0.27272727 0.46153846
## 66  0.41666667 0.41666667 0.41666667 0.23076923 0.45454545
## 67  0.28571429 0.33333333 0.21428571 0.33333333 0.28571429
## 68  0.36363636 0.61538462 0.72727273 0.53846154 0.35714286
## 69  0.30769231 0.07142857 0.23076923 0.36363636 0.33333333
## 70  0.21428571 0.53846154 0.50000000 0.61538462 0.53846154
## 71  0.41666667 0.33333333 0.14285714 0.55555556 0.30000000
## 72  0.66666667 0.57142857 0.72727273 0.45454545 0.30769231
## 73  0.40000000 0.64285714 0.53846154 0.46153846 0.57142857
## 74  0.50000000 0.50000000 0.38461538 0.50000000 0.36363636
## 75  0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 76  0.78571429 0.71428571 0.57142857 0.64285714 0.71428571
## 77  0.66666667 0.60000000 0.61538462 0.69230769 0.50000000
## 78  0.38461538 0.58333333 0.35294118 0.25000000 0.66666667
## 79  0.14285714 0.12500000 0.12500000 0.10000000 0.40000000
## 80  0.40000000 0.27272727 0.25000000 0.23076923 0.25000000
## 81  0.50000000 0.35714286 0.57142857 0.66666667 0.33333333
## 82  0.16666667 0.50000000 0.30769231 0.07692308 0.30000000
## 83  0.42857143 0.30769231 0.61538462 0.41666667 0.66666667
## 84  0.00000000 0.00000000 0.12500000 0.00000000 0.00000000
## 85  0.25000000 0.10000000 0.28571429 0.00000000 0.28571429
## 86  0.20000000 0.18181818 0.40000000 0.27272727 0.30769231
## 87  0.33333333 0.33333333 0.46153846 0.58333333 0.42857143
## 88  0.50000000 0.25000000 0.50000000 0.50000000 0.50000000
## 89  0.30000000 0.33333333 0.30000000 0.25000000 0.33333333
## 90  0.44444444 0.33333333 0.30000000 0.00000000 0.15384615
## 91  0.23076923 0.16666667 0.18181818 0.40000000 0.41666667
## 92  0.08333333 0.57142857 0.46153846 0.54545455 0.33333333
## 93  0.53846154 0.35714286 0.69230769 0.57142857 0.50000000
## 94  0.45454545 0.30769231 0.23076923 0.41666667 0.50000000
## 95  0.33333333 0.40000000 0.50000000 0.69230769 0.38461538
## 96  0.27272727 0.50000000 0.20000000 0.40000000 0.41666667
## 97  0.36363636 0.45454545 0.20000000 0.33333333 0.44444444
## 98  0.07692308 0.50000000 0.30769231 0.18181818 0.63636364
## 99  0.14285714 0.25000000 0.33333333 0.08333333 0.21428571
## 100 0.30000000 0.18181818 0.30000000 0.27272727 0.33333333
## 101 0.50000000 0.66666667 0.33333333 0.33333333 0.16666667
## 102 0.55555556 0.30000000 0.22222222 0.55555556 0.25000000
## 103 0.54545455 0.50000000 0.23076923 0.45454545 0.25000000
## 104 0.40000000 0.25000000 0.30769231 0.40000000 0.61538462
## 105 0.12500000 0.50000000 0.36363636 0.22222222 0.22222222
```

```
## 106 0.25000000 0.28571429 0.37500000 0.00000000 0.00000000
## 107 0.14285714 0.00000000 0.18181818 0.20000000 0.27272727
## 108 0.54545455 0.36363636 0.27272727 0.33333333 0.35714286
## 109 0.43750000 0.28571429 0.33333333 0.42857143 0.33333333
## 110 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 111 0.18181818 0.36363636 0.20000000 0.41666667 0.40000000
## 112 0.20000000 0.16666667 0.20000000 0.27272727 0.36363636
## 113 0.18181818 0.20000000 0.38461538 0.25000000 0.20000000
## 114 0.11111111 0.00000000 0.18181818 0.11111111 0.28571429
## 115 0.45454545 0.36363636 0.15384615 0.40000000 0.45454545
## 116 0.00000000 0.12500000 0.14285714 0.00000000 0.00000000
## 117 0.25000000 0.30769231 0.18181818 0.41666667 0.16666667
## 118 0.35714286 0.40000000 0.26666667 0.42857143 0.38461538
## 119 0.20000000 0.14285714 0.22222222 0.16666667 0.16666667
## 120 0.12500000 0.16666667 0.00000000 0.10000000 0.00000000
## 121 0.25000000 0.12500000 0.15384615 0.25000000 0.22222222
## 122 0.54545455 0.23076923 0.50000000 0.42857143 0.42857143
## 123 0.08333333 0.09090909 0.18181818 0.25000000 0.18181818
## 124 0.16666667 0.28571429 0.25000000 0.25000000 0.11111111
## 125 0.00000000 0.00000000 0.14285714 0.00000000 0.16666667
## 126 0.08333333 0.50000000 0.50000000 0.27272727 0.10000000
## 127 0.36363636 0.27272727 0.16666667 0.33333333 0.25000000
## 128 0.38461538 0.38461538 0.45454545 0.61538462 0.33333333
## 129 0.18181818 0.36363636 0.20000000 0.27272727 0.27272727
## 130 0.58333333 0.50000000 0.50000000 0.54545455 0.38461538
## 131 0.16666667 0.27272727 0.28571429 0.33333333 0.38461538
## 132 0.38461538 0.16666667 0.30000000 0.27272727 0.15384615
## 133 0.28571429 0.11111111 0.14285714 0.60000000 0.30000000
## 134 0.33333333 0.33333333 0.18181818 0.22222222 0.27272727
## 135 0.21428571 0.20000000 0.26666667 0.46153846 0.07692308
## 136 0.30000000 0.30769231 0.33333333 0.38461538 0.18181818
## 137 0.27272727 0.30769231 0.54545455 0.25000000 0.27272727
## 138 0.36363636 0.20000000 0.20000000 0.27272727 0.33333333
## 139 0.11111111 0.00000000 0.11111111 0.00000000 0.25000000
## 140 0.00000000 0.14285714 0.20000000 0.20000000 0.28571429
## 141 0.40000000 0.33333333 0.33333333 0.37500000 0.33333333
## 142 0.25000000 0.10000000 0.40000000 0.30000000 0.37500000
## 143 0.33333333 0.22222222 0.12500000 0.00000000 0.14285714
## 144 0.50000000 0.18181818 0.20000000 0.16666667 0.30000000
## 145 0.11111111 0.23076923 0.20000000 0.50000000 0.37500000
## 146 0.00000000 0.22222222 0.00000000 0.42857143 0.20000000
## 147 0.20000000 0.16666667 0.00000000 0.33333333 0.11111111
## 148 0.18181818 0.22222222 0.10000000 0.27272727 0.18181818
## 149 0.40000000 0.18181818 0.00000000 0.09090909 0.23076923
## 150 0.25000000 0.20000000 0.20000000 0.25000000 0.20000000
## 151 0.37500000 0.25000000 0.37500000 0.50000000 0.00000000
## 152 0.28571429 0.14285714 0.25000000 0.11111111 0.57142857
## 153 0.27272727 0.27272727 0.66666667 0.27272727 0.25000000
## 154 0.00000000 0.14285714 0.00000000 0.40000000 0.00000000
## 155 0.25000000 0.16666667 0.22222222 0.28571429 0.14285714
## 156 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 157 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 158 0.27272727 0.16666667 0.36363636 0.18181818 0.23076923
## 159 0.36363636 0.33333333 0.18181818 0.10000000 0.30000000
## 160 0.00000000 0.00000000 0.25000000 0.00000000 0.40000000
## 161 0.33333333 0.00000000 0.40000000 0.37500000 0.22222222
## 162 0.50000000 0.28571429 0.22222222 0.14285714 0.28571429
## 163 0.14285714 0.20000000 0.28571429 0.16666667 0.42857143
```

```
## 164 0.33333333 0.11111111 0.37500000 0.16666667 0.20000000
## 165 0.16666667 0.60000000 0.60000000 0.00000000 0.33333333
## 166 0.00000000 0.22222222 0.00000000 0.16666667 0.11111111
## 167 0.33333333 0.30000000 0.11111111 0.33333333 0.10000000
## 168 0.14285714 0.00000000 0.00000000 0.14285714 0.20000000
## 169 0.00000000 0.20000000 0.00000000 0.00000000 0.00000000
## 170 0.37500000 0.12500000 0.22222222 0.22222222 0.28571429
## 171 0.25000000 0.00000000 0.14285714 0.00000000 0.33333333
## 172 0.25000000 0.20000000 0.10000000 0.25000000 0.25000000
## 173 0.20000000 0.36363636 0.23076923 0.33333333 0.30769231
## 174 0.00000000 0.16666667 0.14285714 0.12500000 0.14285714
## 175 0.15384615 0.28571429 0.40000000 0.36363636 0.38461538
## 176 0.22222222 0.10000000 0.42857143 0.50000000 0.33333333
## 177 0.25000000 0.14285714 0.20000000 0.00000000 0.40000000
## 178 0.11111111 0.15384615 0.23076923 0.00000000 0.14285714
## 179 0.30000000 0.09090909 0.40000000 0.30000000 0.40000000
## 180 0.25000000 0.40000000 0.25000000 0.25000000 0.33333333
## 181 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 182 0.00000000 0.09090909 0.14285714 0.12500000 0.33333333
## 183 0.40000000 0.20000000 0.16666667 0.00000000 0.28571429
## 184 0.25000000 0.50000000 0.16666667 0.25000000 0.11111111
## 185 0.25000000 0.14285714 0.00000000 0.28571429 0.28571429
## 186 0.33333333 0.16666667 0.14285714 0.20000000 0.16666667
## 187 0.16666667 0.28571429 0.28571429 0.22222222 0.00000000
## 188 0.16666667 0.40000000 0.12500000 0.16666667 0.40000000
## 189 0.12500000 0.33333333 0.00000000 0.16666667 0.12500000
## 190 0.20000000 0.18181818 0.22222222 0.09090909 0.18181818
## 191 0.22222222 0.12500000 0.25000000 0.33333333 0.25000000
## 192 0.16666667 0.00000000 0.10000000 0.60000000 0.20000000
## 193 0.00000000 0.33333333 0.14285714 0.00000000 0.00000000
## 194 0.14285714 0.16666667 0.14285714 0.00000000 0.14285714
## 195 0.50000000 0.62500000 0.18181818 0.50000000 0.10000000
## 196 0.20000000 0.00000000 0.00000000 0.00000000 0.00000000
## 197 0.40000000 0.77777778 0.40000000 0.37500000 0.11111111
## 198 0.50000000 0.25000000 0.00000000 0.00000000 0.25000000
## 199 0.00000000 0.00000000 0.00000000 0.25000000 0.25000000
## 200 0.14285714 0.00000000 0.20000000 0.25000000 0.40000000
## 201 0.50000000 0.00000000 0.00000000 0.25000000 0.20000000
## 202 0.44444444 0.50000000 0.62500000 0.44444444 0.44444444
## 203 0.11111111 0.22222222 0.11111111 0.10000000 0.00000000
## 204 0.28571429 0.33333333 0.14285714 0.40000000 0.14285714
## 205 0.33333333 0.25000000 0.20000000 0.20000000 0.25000000
## 206 0.16666667 0.00000000 0.00000000 0.00000000 0.12500000
## 207 0.33333333 0.37500000 0.00000000 0.50000000 0.16666667
## 208 0.57142857 0.00000000 0.33333333 0.40000000 0.16666667
## 209 0.10000000 0.00000000 0.33333333 0.25000000 0.28571429
## 210 0.14285714 0.16666667 0.33333333 0.25000000 0.50000000
## 211 0.33333333 0.25000000 0.33333333 0.20000000 0.40000000
## 212 0.33333333 0.20000000 0.16666667 0.33333333 0.33333333
## 213 0.00000000 0.00000000 0.16666667 0.16666667 0.40000000
## 214 0.16666667 0.33333333 0.50000000 0.40000000 0.40000000
## 215 0.22222222 0.28571429 0.14285714 0.00000000 0.28571429
## 216 0.00000000 0.12500000 0.33333333 0.37500000 0.25000000
## 217 0.12500000 0.30000000 0.14285714 0.00000000 0.28571429
## 218 0.42857143 0.50000000 0.50000000 0.50000000 0.42857143
## 219 0.16666667 0.33333333 0.42857143 0.33333333 0.25000000
## 220 0.37500000 0.25000000 0.20000000 0.14285714 0.57142857
## 221 0.25000000 0.33333333 0.25000000 0.37500000 0.40000000
```

```
## 222 0.14285714 0.50000000 0.66666667 0.33333333 0.37500000
## 223 0.00000000 0.00000000 0.00000000 0.33333333 0.00000000
## 224 0.00000000 0.60000000 0.25000000 0.00000000 0.14285714
## 225 0.60000000 0.33333333 0.40000000 0.25000000 0.16666667
## 226 0.50000000 0.50000000 0.83333333 0.28571429 0.66666667
## 227 0.11111111 0.42857143 0.14285714 0.50000000 0.30000000
## 228 0.00000000 0.00000000 0.00000000 0.50000000 0.16666667
## 229 0.00000000 0.00000000 0.25000000 0.00000000 0.25000000
## 230 0.16666667 0.16666667 0.33333333 0.25000000 0.20000000
## 231 0.20000000 0.00000000 0.00000000 0.20000000 0.20000000
## 232 0.42857143 0.28571429 0.60000000 0.37500000 0.60000000
## 233 0.20000000 0.33333333 0.12500000 0.33333333 0.20000000
## 234 0.20000000 0.12500000 0.16666667 0.00000000 0.25000000
## 235 0.25000000 0.00000000 0.00000000 0.00000000 0.00000000
## 236 0.25000000 0.25000000 0.25000000 0.14285714 0.28571429
## 237 0.00000000 0.25000000 0.00000000 0.16666667 0.00000000
## 238 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 239 0.16666667 0.00000000 0.00000000 0.00000000 0.16666667
## 240 0.25000000 0.00000000 0.20000000 0.16666667 0.40000000
## 241 0.00000000 0.20000000 0.16666667 0.00000000 0.00000000
## 242 0.00000000 0.00000000 0.00000000 0.00000000 0.33333333
## 243 0.20000000 0.20000000 0.66666667 0.00000000 0.20000000
## 244 0.50000000 0.42857143 0.66666667 0.00000000 0.00000000
## 245 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 246 0.00000000 0.00000000 0.25000000 0.20000000 0.00000000
## 247 0.20000000 0.20000000 0.00000000 0.00000000 0.00000000
## 248 0.42857143 0.25000000 0.50000000 0.25000000 0.40000000
## 249 0.16666667 0.40000000 0.60000000 0.50000000 0.33333333
## 250 0.75000000 0.33333333 0.75000000 0.20000000 0.50000000
## 251 0.40000000 0.25000000 0.00000000 0.00000000 0.40000000
## 252 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 253 0.00000000 0.25000000 0.00000000 0.00000000 0.00000000
## 254 0.50000000 0.50000000 0.00000000 0.33333333 0.00000000
## 255 0.25000000 0.25000000 0.50000000 0.33333333 0.33333333
## 256 0.40000000 0.50000000 0.66666667 0.66666667 0.40000000
## 257 0.40000000 0.14285714 0.14285714 0.16666667 0.14285714
## 258 0.00000000 0.00000000 0.00000000 0.40000000 0.40000000
## 259 0.00000000 0.33333333 0.33333333 0.33333333 0.25000000
## 260 0.00000000 0.33333333 0.33333333 0.14285714 0.00000000
## 261 0.20000000 0.00000000 0.25000000 0.00000000 0.00000000
## 262 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 263 0.00000000 0.00000000 0.00000000 0.00000000 0.00000000
## 264 0.33333333 0.00000000 0.14285714 0.00000000 0.16666667
## 265 0.33333333 0.60000000 0.25000000 0.25000000 0.75000000
## 266 0.00000000 0.00000000 0.20000000 0.25000000 0.50000000
## 267 0.50000000 0.66666667 0.66666667 0.50000000 0.40000000
## 268 0.40000000 0.20000000 1.00000000 0.33333333 0.33333333
## 269 0.50000000 0.20000000 0.50000000 0.25000000 0.50000000
## 270 0.25000000 0.33333333 0.50000000 0.25000000 0.33333333
## 271 0.25000000 0.33333333 0.16666667 0.00000000 0.20000000
## 272 0.25000000 0.20000000 0.00000000 0.25000000 0.16666667
## 273 0.00000000 0.00000000 0.00000000 0.16666667 0.50000000
## 274 0.33333333 0.25000000 0.50000000 0.33333333 0.50000000
## 275 0.33333333 0.14285714 0.50000000 0.40000000 0.40000000
## 276 0.36363636 0.25000000 0.28571429 0.33333333 0.36363636
## 277 0.27272727 0.60000000 0.09090909 0.09090909 0.50000000
## 278 0.54545455 0.50000000 0.20000000 0.30769231 0.41666667
## 279 0.27272727 0.33333333 0.44444444 0.60000000 0.30000000
```

```
## 280 0.16666667 0.21428571 0.18181818 0.18181818 0.53846154
## 281 0.20000000 0.50000000 0.33333333 0.50000000 0.25000000
## 282 0.10000000 0.37500000 0.30000000 0.20000000 0.09090909
## 283 0.20000000 0.20000000 0.20000000 0.00000000 0.00000000
## 284 0.00000000 0.25000000 0.22222222 0.00000000 0.20000000
## 285 0.16666667 0.20000000 0.12500000 0.20000000 0.28571429
## 286 0.00000000 0.25000000 0.25000000 0.16666667 0.00000000
## 287 0.33333333 0.33333333 0.33333333 0.57142857 0.42857143
## 288 0.00000000 0.25000000 0.00000000 0.20000000 0.00000000
## 289 0.25000000 0.40000000 0.42857143 0.33333333 0.75000000
## 290 0.00000000 0.00000000 0.14285714 0.40000000 0.16666667
## 291 0.20000000 0.33333333 0.00000000 0.25000000 0.00000000
## 292 0.33333333 0.16666667 0.16666667 0.25000000 0.25000000
## 293 0.00000000 0.37500000 0.50000000 0.42857143 0.50000000
## 294 0.25000000 0.40000000 0.40000000 0.40000000 0.33333333
## 295 0.00000000 0.00000000 0.28571429 0.50000000 1.00000000
## 296 0.16666667 0.33333333 0.50000000 0.14285714 0.33333333
## 297 0.25000000 0.20000000 0.33333333 0.16666667 0.12500000
## 298 0.23076923 0.40000000 0.76923077 0.66666667 0.50000000
## 299 0.33333333 0.66666667 0.50000000 0.66666667 0.33333333
## 300 0.00000000 0.25000000 0.00000000 0.33333333 0.33333333
```

3.2 Spatial Predictions and Projections

3.2.1 ESM Ensemble of Small Models

```
library(biomod2)
```

```
## biomod2 3.3-13 loaded.
##
## Type browseVignettes(package='biomod2') to access directly biomod2 vignettes.
```

```
path.wd<-getwd()
```

```
# species
# occurrences
xy <- inv[,1:2]
head(xy)
```

```
##        x      y
## 1 142.25 -10.25
## 2 142.25 -10.75
## 3 131.25 -11.25
## 4 132.25 -11.25
## 5 142.25 -11.25
## 6 142.75 -11.25
```

```
sp_occ <- inv[11]

# env
current <- inv[3:7]
head(current)
```

```
##      aetpet    gdd      p      pet     stdp
## 1 0.3180346 7965.1 1595.7 1950.320 137.8134
## 2 0.2807616 7888.9 1693.7 1991.475 156.3950
## 3 0.2638533 8165.3 1595.0 2179.968 127.0621
## 4 0.2790938 8195.6 1346.0 1919.897 114.7686
## 5 0.3030646 7858.1 1711.1 1795.255 158.3286
```

```
## 6 0.3217786 7888.5 1711.1 1788.220 151.8030
```

```
## BIOMOD
setwd(path.wd)
t1 <- Sys.time()
sp<-1
```

```
### Formating the data with the BIOMOD_FormatingData() function form the package biomod2

myBiomodData <- BIOMOD_FormatingData( resp.var = as.numeric(sp_occ[,sp]),
                                      expl.var = current,
                                      resp.xy = xy,
                                      resp.name = colnames(sp_occ)[sp])
```

```
##
## -=-=-=-=-=-=-=-=-=-=-=-= species_occ Data Formating -=-=-=-=-=-=-=-=-=-=-=-=
##
##  Response variable name was converted into species.occ
## > No pseudo absences selection !
##       ! No data has been set aside for modeling evaluation
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```

```
myBiomodOption <- Print_Default_ModelingOptions()
```

```
##
##  Defaut modeling options. copy, change what you want paste it as arg to BIOMOD_ModelingOptions
##
##
## -=-=-=-=-=-=-=-=-=-=-=-=  'BIOMOD.Model.Options'  -=-=-=-=-=-=-=-=-=-=-=-=
##
##
## GLM = list( type = 'quadratic',
##             interaction.level = 0,
##             myFormula = NULL,
##             test = 'AIC',
##             family = binomial(link = 'logit'),
##             mustart = 0.5,
##             control = glm.control(epsilon = 1e-08, maxit = 50
## , trace = FALSE) ),
##
##
## GBM = list( distribution = 'bernoulli',
##             n.trees = 2500,
##             interaction.depth = 7,
##             n.minobsinnode = 5,
##             shrinkage = 0.001,
##             bag.fraction = 0.5,
##             train.fraction = 1,
##             cv.folds = 3,
##             keep.data = FALSE,
##             verbose = FALSE,
##             perf.method = 'cv'),
##
## GAM = list( algo = 'GAM_mgcv',
##             type = 's_smoother',
##             k = -1,
##             interaction.level = 0,
##             myFormula = NULL,
##             family = binomial(link = 'logit'),
##             method = 'GCV.Cp',
```

```
##             optimizer = c('outer','newton'),
##             select = FALSE,
##             knots = NULL,
##             paraPen = NULL,
##             control = list(nthreads = 1, irls.reg = 0, epsilon = 1e-07
## , maxit = 200, trace = FALSE, mgcv.tol = 1e-07, mgcv.half = 15
## , rank.tol = 1.49011611938477e-08
## , nlm = list(ndigit=7, gradtol=1e-06, stepmax=2, steptol=1e-04, iterlim=200, check.analyticals=0)
## , optim = list(factr=1e+07)
## , newton = list(conv.tol=1e-06, maxNstep=5, maxSstep=2, maxHalf=30, use.svd=0)
## , outerPIsteps = 0, idLinksBases = TRUE, scalePenalty = TRUE
## , keepData = FALSE, scale.est = fletcher) ),
##
##
## CTA = list( method = 'class',
##             parms = 'default',
##             cost = NULL,
##             control = list(xval = 5, minbucket = 5, minsplit = 5
## , cp = 0.001, maxdepth = 25) ),
##
##
## ANN = list( NbCV = 5,
##             size = NULL,
##             decay = NULL,
##             rang = 0.1,
##             maxit = 200),
##
## SRE = list( quant = 0.025),
##
## FDA = list( method = 'mars',
##             add_args = NULL),
##
## MARS = list( type = 'simple',
##              interaction.level = 0,
##              myFormula = NULL,
##              nk = NULL,
##              penalty = 2,
##              thresh = 0.001,
##              nprune = NULL,
##              pmethod = 'backward'),
##
## RF = list( do.classif = TRUE,
##            ntree = 500,
##            mtry = 'default',
##            nodesize = 5,
##            maxnodes = NULL),
##
## MAXENT.Phillips = list( path_to_maxent.jar = '/private/var/folders/tq/p13f4x0n75d94lvlkzzr4ylr000
##                memory_allocated = 512,
##                background_data_dir = 'default',
##                maximumbackground = 'default',
##                maximumiterations = 200,
##                visible = FALSE,
##                linear = TRUE,
##                quadratic = TRUE,
##                product = TRUE,
##                threshold = TRUE,
##                hinge = TRUE,
```

```
##                lq2lqptthreshold = 80,
##                l2lqthreshold = 10,
##                hingethreshold = 15,
##                beta_threshold = -1,
##                beta_categorical = -1,
##                beta_lqp = -1,
##                beta_hinge = -1,
##                betamultiplier = 1,
##                defaultprevalence = 0.5),
##
## MAXENT.Tsuruoka = list( l1_regularizer = 0,
##                         l2_regularizer = 0,
##                         use_sgd = FALSE,
##                         set_heldout = 0,
##                         verbose = FALSE)
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```

```
myBiomodOption@GLM$test = 'none'
myBiomodOption@GBM$interaction.depth = 2
```

```
### Calibration of simple bivariate models
my.ESM <- ecospat.ESM.Modeling( data=myBiomodData,
                                models=c('GLM','RF'),
                                models.options=myBiomodOption,
                                NbRunEval=1,
                                DataSplit=70,
                                weighting.score=c("AUC"),
                                parallel=F)
```

```
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.1 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( aetpet gdd )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## -=-=-=- Run :  ESM.BIOMOD.1_AllData
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.1_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
```

```
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.1 ~ 1 + aetpet + I(aetpet^2) + gdd + I(gdd^2)
## <environment: 0x7f89a3baf548>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=- ESM.BIOMOD.1_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.1 ~ 1 + aetpet + I(aetpet^2) + gdd + I(gdd^2)
## <environment: 0x7f89c25c2068>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.2 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( aetpet p )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## -=-=-=- Run :  ESM.BIOMOD.2_AllData
##
##
## -=-=-=-=-=-=- ESM.BIOMOD.2_AllData_RUN1
```

```
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.2 ~ 1 + aetpet + I(aetpet^2) + p + I(p^2)
## <environment: 0x7f89a7181878>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=- ESM.BIOMOD.2_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.2 ~ 1 + aetpet + I(aetpet^2) + p + I(p^2)
## <environment: 0x7f89a3bb7190>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.3 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( aetpet pet )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## -=-=-=- Run :  ESM.BIOMOD.3_AllData
##
##
```

```
## -=-=-=-=-=-=- ESM.BIOMOD.3_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.3 ~ 1 + aetpet + I(aetpet^2) + pet + I(pet^2)
## <environment: 0x7f89bce8db10>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=- ESM.BIOMOD.3_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.3 ~ 1 + aetpet + I(aetpet^2) + pet + I(pet^2)
## <environment: 0x7f89a487dca0>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: algorithm did not converge
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.4 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( aetpet stdp )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
```

```
##
## -=-=-=- Run :  ESM.BIOMOD.4_AllData
##
##
## -=-=-=-=-=-=- ESM.BIOMOD.4_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.4 ~ 1 + aetpet + I(aetpet^2) + stdp + I(stdp^2)
## <environment: 0x7f89a47ef838>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=- ESM.BIOMOD.4_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.4 ~ 1 + aetpet + I(aetpet^2) + stdp + I(stdp^2)
## <environment: 0x7f89a8275ea8>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=- ESM.BIOMOD.5 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( gdd p )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
```

```
## -=-=-=- Run :  ESM.BIOMOD.5_AllData
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.5_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.5 ~ 1 + gdd + I(gdd^2) + p + I(p^2)
## <environment: 0x7f89a3caacd8>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.5_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.5 ~ 1 + gdd + I(gdd^2) + p + I(p^2)
## <environment: 0x7f89c25ad0a0>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=- Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.6 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( gdd pet )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## -=-=-=- Run :  ESM.BIOMOD.6_AllData
```

```
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.6_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.6 ~ 1 + gdd + I(gdd^2) + pet + I(pet^2)
## <environment: 0x7f89a4873b18>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.6_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.6 ~ 1 + gdd + I(gdd^2) + pet + I(pet^2)
## <environment: 0x7f89c25fe110>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...

## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.7 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( gdd stdp )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
```

```
## -=-=-=- Run :  ESM.BIOMOD.7_AllData
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.7_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.7 ~ 1 + gdd + I(gdd^2) + stdp + I(stdp^2)
## <environment: 0x7f89a3c90778>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.7_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.7 ~ 1 + gdd + I(gdd^2) + stdp + I(stdp^2)
## <environment: 0x7f89a49a5808>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: algorithm did not converge

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=- ESM.BIOMOD.8 Modeling Summary -=-=-=-=-=-=-=-=-=-=-
##
##  2  environmental variables ( p pet )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
```

```
##
## -=-=-=- Run :  ESM.BIOMOD.8_AllData
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.8_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.8 ~ 1 + p + I(p^2) + pet + I(pet^2)
## <environment: 0x7f89a48fbd48>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.8_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.8 ~ 1 + p + I(p^2) + pet + I(pet^2)
## <environment: 0x7f89a4936270>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-=-= ESM.BIOMOD.9 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( p stdp )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
```

```
## -=-=-=- Run :  ESM.BIOMOD.9_AllData
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.9_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.9 ~ 1 + p + I(p^2) + stdp + I(stdp^2)
## <environment: 0x7f89a48fc270>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.9_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.9 ~ 1 + p + I(p^2) + stdp + I(stdp^2)
## <environment: 0x7f89a4914b18>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=- Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## Loading required library...
##
## Checking Models arguments...
##
## ! User defined data-split table was given -> NbRunEval, DataSplit and do.full.models argument wil
## Creating suitable Workdir...
##
##  > Automatic weights creation to rise a 0.5 prevalence
##
##
## -=-=-=-=-=-=-=-=-=-=-=-=- ESM.BIOMOD.10 Modeling Summary -=-=-=-=-=-=-=-=-=-=-=-=-=
##
##  2  environmental variables ( pet stdp )
## Number of evaluation repetitions : 2
## Models selected : GLM RF
##
## Total number of model runs : 4
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##
## -=-=-=- Run :  ESM.BIOMOD.10_AllData
```

```
##
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.10_AllData_RUN1
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.10 ~ 1 + pet + I(pet^2) + stdp + I(stdp^2)
## <environment: 0x7f89a48554a0>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
##  Evaluating Model stuff...
##
## -=-=-=-=-=-=-=- ESM.BIOMOD.10_AllData_RUN2
##
## Model=GLM ( quadratic with no interaction )
##  No stepwise procedure
##  ! You might be confronted to models convergence issues !
##  selected formula : ESM.BIOMOD.10 ~ 1 + pet + I(pet^2) + stdp + I(stdp^2)
## <environment: 0x7f89c25dc068>
##
##  Model scaling...
##  Evaluating Model stuff...
## Model=Breiman and Cutler's random forests for classification and regression
##  Model scaling...
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
##
##  Evaluating Model stuff...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```

```
### Evaluation and average of simple bivariate models to ESMs
my.ESM_EF <- ecospat.ESM.EnsembleModeling(my.ESM,weighting.score=c("SomersD"),threshold=0)
```

```
### Projection of simple bivariate models into new space
my.ESM_proj_current <- ecospat.ESM.Projection(ESM.modeling.output=my.ESM,
                                              new.env=current)
```

```
##
## -=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.1_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.1_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.2_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.2_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
```

```
##  > Projecting ESM.BIOMOD.3_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.3_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.4_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.4_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.5_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.5_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.6_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.6_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.7_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.7_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.8_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.8_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.9_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.9_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
##
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Do Models Projections -=-=-=-=-=-=-=-=-=-=-=-=-=-=-
##
##      ! 'do.stack' arg is always set as TRUE for data.frame/matrix dataset
##  > Projecting ESM.BIOMOD.10_AllData_RUN2_GLM ...
##  > Projecting ESM.BIOMOD.10_AllData_RUN2_RF ...
## -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-= Done -=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```

```
### Projection of calibrated ESMs into new space
my.ESM_EFproj_current <- ecospat.ESM.EnsembleProjection(ESM.prediction.output=my.ESM_proj_current,
                                                        ESM.EnsembleModeling.output=my.ESM_EF)
```

3.3 Spatial prediction of communities

Input data for the first argument (proba) as data frame of rough probabilities from SDMs for all species in columns in the considered sites in rows.

```
proba <- ecospat.testData[,73:92]
```

Input data for the second argument (sr) as data frame with richness value in the first column and sites.

```
sr <- as.data.frame(rowSums(proba))
```

3.4 SESAM framework with *ecospat.SESAM.prr()*

```
ecospat.SESAM.prr(proba, sr)
```

```
## [1] "test.prr, processing row 1"
## [1] "test.prr, processing row 2"
## [1] "test.prr, processing row 3"
## [1] "test.prr, processing row 4"
## [1] "test.prr, processing row 5"
## [1] "test.prr, processing row 6"
## [1] "test.prr, processing row 7"
## [1] "test.prr, processing row 8"
## [1] "test.prr, processing row 9"
## [1] "test.prr, processing row 10"
## [1] "test.prr, processing row 11"
## [1] "test.prr, processing row 12"
## [1] "test.prr, processing row 13"
## [1] "test.prr, processing row 14"
## [1] "test.prr, processing row 15"
## [1] "test.prr, processing row 16"
## [1] "test.prr, processing row 17"
## [1] "test.prr, processing row 18"
## [1] "test.prr, processing row 19"
## [1] "test.prr, processing row 20"
## [1] "test.prr, processing row 21"
## [1] "test.prr, processing row 22"
## [1] "test.prr, processing row 23"
## [1] "test.prr, processing row 24"
## [1] "test.prr, processing row 25"
## [1] "test.prr, processing row 26"
## [1] "test.prr, processing row 27"
## [1] "test.prr, processing row 28"
## [1] "test.prr, processing row 29"
## [1] "test.prr, processing row 30"
## [1] "test.prr, processing row 31"
## [1] "test.prr, processing row 32"
## [1] "test.prr, processing row 33"
## [1] "test.prr, processing row 34"
## [1] "test.prr, processing row 35"
## [1] "test.prr, processing row 36"
## [1] "test.prr, processing row 37"
## [1] "test.prr, processing row 38"
## [1] "test.prr, processing row 39"
## [1] "test.prr, processing row 40"
## [1] "test.prr, processing row 41"
## [1] "test.prr, processing row 42"
## [1] "test.prr, processing row 43"
```

```
## [1] "test.prr, processing row 44"
## [1] "test.prr, processing row 45"
## [1] "test.prr, processing row 46"
## [1] "test.prr, processing row 47"
## [1] "test.prr, processing row 48"
## [1] "test.prr, processing row 49"
## [1] "test.prr, processing row 50"
## [1] "test.prr, processing row 51"
## [1] "test.prr, processing row 52"
## [1] "test.prr, processing row 53"
## [1] "test.prr, processing row 54"
## [1] "test.prr, processing row 55"
## [1] "test.prr, processing row 56"
## [1] "test.prr, processing row 57"
## [1] "test.prr, processing row 58"
## [1] "test.prr, processing row 59"
## [1] "test.prr, processing row 60"
## [1] "test.prr, processing row 61"
## [1] "test.prr, processing row 62"
## [1] "test.prr, processing row 63"
## [1] "test.prr, processing row 64"
## [1] "test.prr, processing row 65"
## [1] "test.prr, processing row 66"
## [1] "test.prr, processing row 67"
## [1] "test.prr, processing row 68"
## [1] "test.prr, processing row 69"
## [1] "test.prr, processing row 70"
## [1] "test.prr, processing row 71"
## [1] "test.prr, processing row 72"
## [1] "test.prr, processing row 73"
## [1] "test.prr, processing row 74"
## [1] "test.prr, processing row 75"
## [1] "test.prr, processing row 76"
## [1] "test.prr, processing row 77"
## [1] "test.prr, processing row 78"
## [1] "test.prr, processing row 79"
## [1] "test.prr, processing row 80"
## [1] "test.prr, processing row 81"
## [1] "test.prr, processing row 82"
## [1] "test.prr, processing row 83"
## [1] "test.prr, processing row 84"
## [1] "test.prr, processing row 85"
## [1] "test.prr, processing row 86"
## [1] "test.prr, processing row 87"
## [1] "test.prr, processing row 88"
## [1] "test.prr, processing row 89"
## [1] "test.prr, processing row 90"
## [1] "test.prr, processing row 91"
## [1] "test.prr, processing row 92"
## [1] "test.prr, processing row 93"
## [1] "test.prr, processing row 94"
## [1] "test.prr, processing row 95"
## [1] "test.prr, processing row 96"
## [1] "test.prr, processing row 97"
## [1] "test.prr, processing row 98"
## [1] "test.prr, processing row 99"
## [1] "test.prr, processing row 100"
## [1] "test.prr, processing row 101"
```

```
## [1] "test.prr, processing row 102"
## [1] "test.prr, processing row 103"
## [1] "test.prr, processing row 104"
## [1] "test.prr, processing row 105"
## [1] "test.prr, processing row 106"
## [1] "test.prr, processing row 107"
## [1] "test.prr, processing row 108"
## [1] "test.prr, processing row 109"
## [1] "test.prr, processing row 110"
## [1] "test.prr, processing row 111"
## [1] "test.prr, processing row 112"
## [1] "test.prr, processing row 113"
## [1] "test.prr, processing row 114"
## [1] "test.prr, processing row 115"
## [1] "test.prr, processing row 116"
## [1] "test.prr, processing row 117"
## [1] "test.prr, processing row 118"
## [1] "test.prr, processing row 119"
## [1] "test.prr, processing row 120"
## [1] "test.prr, processing row 121"
## [1] "test.prr, processing row 122"
## [1] "test.prr, processing row 123"
## [1] "test.prr, processing row 124"
## [1] "test.prr, processing row 125"
## [1] "test.prr, processing row 126"
## [1] "test.prr, processing row 127"
## [1] "test.prr, processing row 128"
## [1] "test.prr, processing row 129"
## [1] "test.prr, processing row 130"
## [1] "test.prr, processing row 131"
## [1] "test.prr, processing row 132"
## [1] "test.prr, processing row 133"
## [1] "test.prr, processing row 134"
## [1] "test.prr, processing row 135"
## [1] "test.prr, processing row 136"
## [1] "test.prr, processing row 137"
## [1] "test.prr, processing row 138"
## [1] "test.prr, processing row 139"
## [1] "test.prr, processing row 140"
## [1] "test.prr, processing row 141"
## [1] "test.prr, processing row 142"
## [1] "test.prr, processing row 143"
## [1] "test.prr, processing row 144"
## [1] "test.prr, processing row 145"
## [1] "test.prr, processing row 146"
## [1] "test.prr, processing row 147"
## [1] "test.prr, processing row 148"
## [1] "test.prr, processing row 149"
## [1] "test.prr, processing row 150"
## [1] "test.prr, processing row 151"
## [1] "test.prr, processing row 152"
## [1] "test.prr, processing row 153"
## [1] "test.prr, processing row 154"
## [1] "test.prr, processing row 155"
## [1] "test.prr, processing row 156"
## [1] "test.prr, processing row 157"
## [1] "test.prr, processing row 158"
## [1] "test.prr, processing row 159"
```

```
## [1] "test.prr, processing row 160"
## [1] "test.prr, processing row 161"
## [1] "test.prr, processing row 162"
## [1] "test.prr, processing row 163"
## [1] "test.prr, processing row 164"
## [1] "test.prr, processing row 165"
## [1] "test.prr, processing row 166"
## [1] "test.prr, processing row 167"
## [1] "test.prr, processing row 168"
## [1] "test.prr, processing row 169"
## [1] "test.prr, processing row 170"
## [1] "test.prr, processing row 171"
## [1] "test.prr, processing row 172"
## [1] "test.prr, processing row 173"
## [1] "test.prr, processing row 174"
## [1] "test.prr, processing row 175"
## [1] "test.prr, processing row 176"
## [1] "test.prr, processing row 177"
## [1] "test.prr, processing row 178"
## [1] "test.prr, processing row 179"
## [1] "test.prr, processing row 180"
## [1] "test.prr, processing row 181"
## [1] "test.prr, processing row 182"
## [1] "test.prr, processing row 183"
## [1] "test.prr, processing row 184"
## [1] "test.prr, processing row 185"
## [1] "test.prr, processing row 186"
## [1] "test.prr, processing row 187"
## [1] "test.prr, processing row 188"
## [1] "test.prr, processing row 189"
## [1] "test.prr, processing row 190"
## [1] "test.prr, processing row 191"
## [1] "test.prr, processing row 192"
## [1] "test.prr, processing row 193"
## [1] "test.prr, processing row 194"
## [1] "test.prr, processing row 195"
## [1] "test.prr, processing row 196"
## [1] "test.prr, processing row 197"
## [1] "test.prr, processing row 198"
## [1] "test.prr, processing row 199"
## [1] "test.prr, processing row 200"
## [1] "test.prr, processing row 201"
## [1] "test.prr, processing row 202"
## [1] "test.prr, processing row 203"
## [1] "test.prr, processing row 204"
## [1] "test.prr, processing row 205"
## [1] "test.prr, processing row 206"
## [1] "test.prr, processing row 207"
## [1] "test.prr, processing row 208"
## [1] "test.prr, processing row 209"
## [1] "test.prr, processing row 210"
## [1] "test.prr, processing row 211"
## [1] "test.prr, processing row 212"
## [1] "test.prr, processing row 213"
## [1] "test.prr, processing row 214"
## [1] "test.prr, processing row 215"
## [1] "test.prr, processing row 216"
## [1] "test.prr, processing row 217"
```

```
## [1] "test.prr, processing row 218"
## [1] "test.prr, processing row 219"
## [1] "test.prr, processing row 220"
## [1] "test.prr, processing row 221"
## [1] "test.prr, processing row 222"
## [1] "test.prr, processing row 223"
## [1] "test.prr, processing row 224"
## [1] "test.prr, processing row 225"
## [1] "test.prr, processing row 226"
## [1] "test.prr, processing row 227"
## [1] "test.prr, processing row 228"
## [1] "test.prr, processing row 229"
## [1] "test.prr, processing row 230"
## [1] "test.prr, processing row 231"
## [1] "test.prr, processing row 232"
## [1] "test.prr, processing row 233"
## [1] "test.prr, processing row 234"
## [1] "test.prr, processing row 235"
## [1] "test.prr, processing row 236"
## [1] "test.prr, processing row 237"
## [1] "test.prr, processing row 238"
## [1] "test.prr, processing row 239"
## [1] "test.prr, processing row 240"
## [1] "test.prr, processing row 241"
## [1] "test.prr, processing row 242"
## [1] "test.prr, processing row 243"
## [1] "test.prr, processing row 244"
## [1] "test.prr, processing row 245"
## [1] "test.prr, processing row 246"
## [1] "test.prr, processing row 247"
## [1] "test.prr, processing row 248"
## [1] "test.prr, processing row 249"
## [1] "test.prr, processing row 250"
## [1] "test.prr, processing row 251"
## [1] "test.prr, processing row 252"
## [1] "test.prr, processing row 253"
## [1] "test.prr, processing row 254"
## [1] "test.prr, processing row 255"
## [1] "test.prr, processing row 256"
## [1] "test.prr, processing row 257"
## [1] "test.prr, processing row 258"
## [1] "test.prr, processing row 259"
## [1] "test.prr, processing row 260"
## [1] "test.prr, processing row 261"
## [1] "test.prr, processing row 262"
## [1] "test.prr, processing row 263"
## [1] "test.prr, processing row 264"
## [1] "test.prr, processing row 265"
## [1] "test.prr, processing row 266"
## [1] "test.prr, processing row 267"
## [1] "test.prr, processing row 268"
## [1] "test.prr, processing row 269"
## [1] "test.prr, processing row 270"
## [1] "test.prr, processing row 271"
## [1] "test.prr, processing row 272"
## [1] "test.prr, processing row 273"
## [1] "test.prr, processing row 274"
## [1] "test.prr, processing row 275"
```

```
## [1] "test.prr, processing row 276"
## [1] "test.prr, processing row 277"
## [1] "test.prr, processing row 278"
## [1] "test.prr, processing row 279"
## [1] "test.prr, processing row 280"
## [1] "test.prr, processing row 281"
## [1] "test.prr, processing row 282"
## [1] "test.prr, processing row 283"
## [1] "test.prr, processing row 284"
## [1] "test.prr, processing row 285"
## [1] "test.prr, processing row 286"
## [1] "test.prr, processing row 287"
## [1] "test.prr, processing row 288"
## [1] "test.prr, processing row 289"
## [1] "test.prr, processing row 290"
## [1] "test.prr, processing row 291"
## [1] "test.prr, processing row 292"
## [1] "test.prr, processing row 293"
## [1] "test.prr, processing row 294"
## [1] "test.prr, processing row 295"
## [1] "test.prr, processing row 296"
## [1] "test.prr, processing row 297"
## [1] "test.prr, processing row 298"
## [1] "test.prr, processing row 299"
## [1] "test.prr, processing row 300"
##     glm_Agrostis_capillaris glm_Leontodon_hispidus_sl
## 1                         0                         1
## 2                         1                         0
## 3                         1                         0
## 4                         1                         0
## 5                         1                         0
## 6                         1                         0
## 7                         1                         0
## 8                         1                         0
## 9                         1                         0
## 10                        0                         0
## 11                        1                         0
## 12                        1                         0
## 13                        1                         0
## 14                        1                         0
## 15                        1                         0
## 16                        0                         0
## 17                        1                         0
## 18                        1                         0
## 19                        0                         0
## 20                        1                         0
## 21                        1                         0
## 22                        1                         0
## 23                        1                         0
## 24                        0                         0
## 25                        1                         0
## 26                        1                         0
## 27                        1                         0
## 28                        1                         0
## 29                        1                         0
## 30                        1                         0
## 31                        1                         0
## 32                        1                         0
```

```
## 33                1                 0
## 34                1                 0
## 35                1                 0
## 36                1                 0
## 37                0                 0
## 38                1                 1
## 39                1                 0
## 40                1                 0
## 41                1                 0
## 42                1                 0
## 43                1                 0
## 44                0                 0
## 45                1                 0
## 46                1                 0
## 47                0                 0
## 48                1                 0
## 49                1                 0
## 50                1                 0
## 51                0                 0
## 52                1                 0
## 53                1                 1
## 54                1                 1
## 55                1                 0
## 56                1                 0
## 57                1                 1
## 58                1                 1
## 59                1                 0
## 60                1                 0
## 61                0                 0
## 62                0                 0
## 63                1                 0
## 64                1                 0
## 65                1                 0
## 66                1                 0
## 67                1                 1
## 68                0                 0
## 69                1                 0
## 70                1                 1
## 71                1                 1
## 72                1                 1
## 73                1                 1
## 74                1                 1
## 75                1                 0
## 76                0                 0
## 77                1                 1
## 78                1                 1
## 79                1                 1
## 80                1                 0
## 81                1                 1
## 82                1                 1
## 83                1                 0
## 84                1                 0
## 85                1                 1
## 86                1                 1
## 87                1                 1
## 88                1                 1
## 89                1                 1
## 90                1                 0
```

```
## 91                   1                    0
## 92                   1                    1
## 93                   1                    1
## 94                   1                    1
## 95                   1                    1
## 96                   1                    0
## 97                   1                    1
## 98                   1                    0
## 99                   1                    1
## 100                  1                    0
## 101                  1                    1
## 102                  1                    1
## 103                  1                    1
## 104                  1                    1
## 105                  0                    0
## 106                  1                    0
## 107                  1                    1
## 108                  1                    1
## 109                  1                    1
## 110                  1                    1
## 111                  1                    1
## 112                  1                    1
## 113                  1                    1
## 114                  1                    1
## 115                  1                    1
## 116                  1                    1
## 117                  1                    1
## 118                  1                    1
## 119                  1                    1
## 120                  1                    0
## 121                  1                    1
## 122                  1                    1
## 123                  1                    1
## 124                  1                    0
## 125                  1                    1
## 126                  1                    1
## 127                  1                    1
## 128                  1                    1
## 129                  1                    1
## 130                  1                    1
## 131                  1                    1
## 132                  1                    1
## 133                  1                    1
## 134                  1                    1
## 135                  1                    1
## 136                  1                    1
## 137                  1                    1
## 138                  1                    1
## 139                  1                    1
## 140                  1                    1
## 141                  1                    1
## 142                  1                    0
## 143                  1                    1
## 144                  1                    1
## 145                  0                    1
## 146                  1                    1
## 147                  1                    1
## 148                  1                    1
```

```
## 149                    1                    1
## 150                    0                    1
## 151                    1                    1
## 152                    1                    1
## 153                    1                    1
## 154                    0                    1
## 155                    1                    1
## 156                    1                    1
## 157                    0                    1
## 158                    1                    1
## 159                    1                    1
## 160                    1                    1
## 161                    1                    1
## 162                    1                    1
## 163                    1                    1
## 164                    1                    1
## 165                    1                    1
## 166                    1                    1
## 167                    1                    1
## 168                    1                    1
## 169                    1                    1
## 170                    1                    1
## 171                    1                    1
## 172                    1                    1
## 173                    1                    1
## 174                    1                    1
## 175                    1                    1
## 176                    1                    1
## 177                    1                    0
## 178                    1                    1
## 179                    1                    1
## 180                    1                    1
## 181                    1                    1
## 182                    1                    1
## 183                    1                    1
## 184                    1                    1
## 185                    1                    1
## 186                    0                    1
## 187                    1                    1
## 188                    1                    1
## 189                    0                    1
## 190                    1                    1
## 191                    1                    1
## 192                    0                    1
## 193                    0                    1
## 194                    1                    1
## 195                    1                    1
## 196                    1                    1
## 197                    1                    1
## 198                    0                    1
## 199                    1                    1
## 200                    0                    1
## 201                    1                    1
## 202                    1                    1
## 203                    1                    1
## 204                    0                    1
## 205                    1                    1
## 206                    1                    1
```

```
## 207                0                0
## 208                1                1
## 209                1                1
## 210                0                1
## 211                1                0
## 212                0                1
## 213                0                1
## 214                1                1
## 215                1                1
## 216                0                1
## 217                1                1
## 218                1                1
## 219                0                1
## 220                0                1
## 221                0                1
## 222                1                1
## 223                1                0
## 224                1                1
## 225                0                1
## 226                0                1
## 227                0                1
## 228                0                0
## 229                0                1
## 230                0                1
## 231                0                1
## 232                0                1
## 233                0                1
## 234                0                1
## 235                0                0
## 236                0                1
## 237                0                1
## 238                0                0
## 239                0                1
## 240                0                1
## 241                0                0
## 242                0                0
## 243                0                1
## 244                0                1
## 245                0                1
## 246                0                1
## 247                0                0
## 248                0                0
## 249                0                1
## 250                0                1
## 251                0                1
## 252                0                1
## 253                0                0
## 254                0                0
## 255                0                0
## 256                0                1
## 257                0                0
## 258                0                0
## 259                0                0
## 260                0                0
## 261                0                0
## 262                0                0
## 263                0                0
## 264                0                0
```

```
## 265                        0                         0
## 266                        0                         0
## 267                        0                         0
## 268                        0                         0
## 269                        0                         0
## 270                        0                         0
## 271                        0                         0
## 272                        0                         0
## 273                        0                         0
## 274                        0                         0
## 275                        0                         1
## 276                        1                         1
## 277                        1                         0
## 278                        1                         1
## 279                        1                         1
## 280                        1                         1
## 281                        1                         1
## 282                        1                         1
## 283                        1                         0
## 284                        1                         1
## 285                        1                         1
## 286                        1                         1
## 287                        0                         1
## 288                        0                         1
## 289                        0                         1
## 290                        1                         1
## 291                        0                         1
## 292                        0                         1
## 293                        0                         1
## 294                        0                         1
## 295                        0                         1
## 296                        0                         0
## 297                        0                         0
## 298                        1                         0
## 299                        0                         0
## 300                        0                         0
##     glm_Dactylis_glomerata glm_Trifolium_repens_sstr
## 1                        1                        0
## 2                        1                        1
## 3                        1                        1
## 4                        1                        1
## 5                        1                        1
## 6                        1                        1
## 7                        1                        1
## 8                        1                        1
## 9                        1                        0
## 10                       1                        1
## 11                       1                        1
## 12                       1                        1
## 13                       1                        1
## 14                       1                        1
## 15                       1                        1
## 16                       1                        1
## 17                       1                        1
## 18                       1                        1
## 19                       1                        1
## 20                       1                        1
## 21                       1                        1
```

```
## 22                1                 1
## 23                1                 1
## 24                1                 1
## 25                1                 0
## 26                1                 0
## 27                1                 0
## 28                1                 1
## 29                1                 1
## 30                1                 1
## 31                1                 1
## 32                1                 1
## 33                1                 1
## 34                1                 1
## 35                1                 1
## 36                1                 1
## 37                1                 1
## 38                1                 1
## 39                1                 1
## 40                1                 1
## 41                1                 1
## 42                1                 1
## 43                1                 1
## 44                1                 1
## 45                1                 1
## 46                1                 1
## 47                1                 1
## 48                1                 1
## 49                1                 1
## 50                1                 1
## 51                1                 1
## 52                1                 1
## 53                1                 1
## 54                1                 1
## 55                1                 1
## 56                1                 1
## 57                1                 1
## 58                1                 1
## 59                1                 1
## 60                1                 1
## 61                1                 0
## 62                1                 1
## 63                1                 0
## 64                1                 0
## 65                1                 0
## 66                1                 0
## 67                1                 0
## 68                1                 0
## 69                1                 1
## 70                1                 0
## 71                1                 1
## 72                1                 0
## 73                1                 1
## 74                1                 1
## 75                1                 0
## 76                1                 0
## 77                1                 1
## 78                1                 1
## 79                1                 1
```

```
## 80                   1                   1
## 81                   1                   1
## 82                   0                   1
## 83                   1                   1
## 84                   0                   0
## 85                   1                   1
## 86                   0                   0
## 87                   1                   1
## 88                   1                   1
## 89                   1                   1
## 90                   1                   1
## 91                   1                   1
## 92                   1                   1
## 93                   1                   1
## 94                   1                   1
## 95                   1                   1
## 96                   1                   0
## 97                   1                   1
## 98                   1                   1
## 99                   1                   1
## 100                  1                   1
## 101                  1                   1
## 102                  1                   0
## 103                  1                   1
## 104                  1                   0
## 105                  1                   0
## 106                  1                   0
## 107                  1                   0
## 108                  1                   1
## 109                  1                   0
## 110                  1                   0
## 111                  1                   0
## 112                  1                   0
## 113                  1                   0
## 114                  1                   0
## 115                  1                   1
## 116                  1                   1
## 117                  1                   0
## 118                  1                   1
## 119                  0                   1
## 120                  0                   1
## 121                  0                   1
## 122                  1                   1
## 123                  0                   0
## 124                  0                   0
## 125                  0                   0
## 126                  1                   1
## 127                  0                   0
## 128                  1                   1
## 129                  0                   0
## 130                  1                   1
## 131                  1                   1
## 132                  1                   1
## 133                  1                   1
## 134                  1                   1
## 135                  1                   0
## 136                  1                   0
## 137                  1                   1
```

```
## 138                1                1
## 139                1                1
## 140                0                0
## 141                0                0
## 142                0                1
## 143                1                1
## 144                0                0
## 145                1                0
## 146                1                0
## 147                1                0
## 148                1                0
## 149                1                0
## 150                1                0
## 151                1                0
## 152                1                0
## 153                1                0
## 154                1                0
## 155                0                0
## 156                0                0
## 157                0                1
## 158                0                1
## 159                0                1
## 160                0                0
## 161                0                1
## 162                0                0
## 163                0                0
## 164                0                1
## 165                0                0
## 166                0                1
## 167                1                1
## 168                0                0
## 169                0                0
## 170                0                0
## 171                0                1
## 172                0                1
## 173                1                0
## 174                0                0
## 175                1                1
## 176                0                0
## 177                0                0
## 178                0                0
## 179                1                0
## 180                0                0
## 181                0                0
## 182                0                0
## 183                0                0
## 184                0                0
## 185                0                0
## 186                1                0
## 187                1                0
## 188                0                0
## 189                1                0
## 190                1                0
## 191                0                0
## 192                1                0
## 193                0                0
## 194                0                0
## 195                0                0
```

```
## 196                0                0
## 197                0                0
## 198                0                0
## 199                0                0
## 200                0                1
## 201                0                0
## 202                0                0
## 203                1                0
## 204                0                0
## 205                0                0
## 206                0                0
## 207                0                0
## 208                0                0
## 209                1                0
## 210                1                0
## 211                0                0
## 212                0                0
## 213                0                0
## 214                0                0
## 215                0                0
## 216                1                0
## 217                1                0
## 218                0                0
## 219                0                0
## 220                0                0
## 221                0                0
## 222                0                0
## 223                0                0
## 224                0                0
## 225                0                0
## 226                0                0
## 227                0                0
## 228                0                0
## 229                0                0
## 230                0                0
## 231                0                0
## 232                0                0
## 233                0                0
## 234                0                0
## 235                0                0
## 236                0                0
## 237                0                0
## 238                0                0
## 239                0                0
## 240                0                0
## 241                0                0
## 242                0                0
## 243                0                0
## 244                0                0
## 245                0                0
## 246                0                0
## 247                0                0
## 248                0                0
## 249                0                0
## 250                0                0
## 251                0                0
## 252                0                0
## 253                0                0
```

```
## 254                      0                       0
## 255                      0                       0
## 256                      0                       0
## 257                      0                       0
## 258                      0                       0
## 259                      0                       0
## 260                      0                       0
## 261                      0                       0
## 262                      0                       0
## 263                      0                       0
## 264                      0                       0
## 265                      0                       0
## 266                      0                       0
## 267                      0                       0
## 268                      0                       0
## 269                      0                       0
## 270                      0                       0
## 271                      0                       0
## 272                      0                       0
## 273                      0                       0
## 274                      0                       0
## 275                      0                       0
## 276                      1                       1
## 277                      1                       1
## 278                      1                       1
## 279                      1                       1
## 280                      0                       0
## 281                      0                       0
## 282                      0                       0
## 283                      0                       0
## 284                      0                       1
## 285                      0                       0
## 286                      0                       1
## 287                      0                       0
## 288                      0                       0
## 289                      0                       0
## 290                      0                       0
## 291                      0                       0
## 292                      0                       0
## 293                      0                       0
## 294                      0                       0
## 295                      0                       0
## 296                      0                       0
## 297                      0                       0
## 298                      1                       1
## 299                      0                       0
## 300                      0                       0
##     glm_Geranium_sylvaticum glm_Ranunculus_acris_sl glm_Prunella_vulgaris
## 1                         0                       0                      0
## 2                         1                       1                      1
## 3                         1                       1                      1
## 4                         1                       1                      1
## 5                         1                       1                      1
## 6                         1                       1                      1
## 7                         1                       1                      1
## 8                         1                       1                      1
## 9                         0                       1                      1
## 10                        0                       1                      1
```

```
## 11                0                 1                 1
## 12                0                 1                 1
## 13                0                 1                 1
## 14                1                 1                 1
## 15                1                 1                 1
## 16                1                 1                 1
## 17                1                 1                 1
## 18                0                 1                 1
## 19                0                 1                 1
## 20                1                 1                 0
## 21                1                 1                 1
## 22                1                 1                 1
## 23                1                 1                 1
## 24                0                 1                 1
## 25                1                 1                 1
## 26                0                 1                 1
## 27                0                 1                 1
## 28                1                 1                 1
## 29                1                 1                 1
## 30                1                 1                 1
## 31                1                 1                 1
## 32                1                 1                 1
## 33                0                 1                 1
## 34                1                 1                 0
## 35                0                 1                 1
## 36                1                 1                 0
## 37                0                 1                 1
## 38                1                 0                 0
## 39                0                 1                 1
## 40                1                 1                 1
## 41                1                 1                 1
## 42                1                 1                 1
## 43                0                 1                 1
## 44                0                 1                 1
## 45                1                 1                 1
## 46                1                 1                 1
## 47                0                 1                 1
## 48                1                 1                 1
## 49                0                 1                 1
## 50                1                 1                 1
## 51                0                 1                 1
## 52                0                 1                 1
## 53                0                 1                 0
## 54                1                 1                 0
## 55                1                 1                 0
## 56                1                 1                 0
## 57                1                 1                 0
## 58                1                 1                 1
## 59                1                 1                 1
## 60                1                 1                 1
## 61                0                 1                 1
## 62                0                 1                 1
## 63                0                 1                 1
## 64                0                 1                 1
## 65                0                 1                 1
## 66                0                 1                 1
## 67                0                 0                 0
## 68                0                 1                 1
```

```
## 69                1                 0                 1
## 70                0                 0                 1
## 71                1                 0                 0
## 72                0                 0                 0
## 73                0                 0                 0
## 74                0                 0                 0
## 75                0                 1                 1
## 76                0                 1                 1
## 77                1                 1                 0
## 78                1                 1                 1
## 79                1                 1                 0
## 80                0                 1                 1
## 81                1                 1                 0
## 82                0                 1                 0
## 83                1                 1                 0
## 84                0                 1                 1
## 85                1                 1                 1
## 86                1                 1                 1
## 87                1                 1                 1
## 88                0                 0                 0
## 89                1                 0                 0
## 90                1                 1                 1
## 91                1                 1                 0
## 92                0                 0                 0
## 93                1                 1                 0
## 94                1                 1                 0
## 95                1                 1                 0
## 96                0                 1                 1
## 97                1                 0                 0
## 98                1                 1                 0
## 99                1                 0                 0
## 100               1                 1                 0
## 101               1                 0                 0
## 102               1                 0                 1
## 103               1                 1                 1
## 104               1                 0                 0
## 105               0                 1                 1
## 106               0                 0                 1
## 107               0                 0                 0
## 108               1                 0                 1
## 109               1                 0                 0
## 110               0                 0                 0
## 111               0                 0                 0
## 112               1                 0                 0
## 113               0                 0                 0
## 114               1                 0                 0
## 115               0                 0                 0
## 116               1                 0                 1
## 117               1                 0                 0
## 118               1                 0                 0
## 119               0                 1                 0
## 120               1                 1                 0
## 121               1                 1                 0
## 122               1                 1                 0
## 123               0                 0                 0
## 124               0                 1                 1
## 125               0                 0                 0
## 126               1                 0                 0
```

```
## 127                0                1                0
## 128                1                1                0
## 129                1                0                1
## 130                1                0                0
## 131                1                0                0
## 132                0                0                0
## 133                0                0                0
## 134                1                0                0
## 135                0                0                0
## 136                0                0                0
## 137                1                0                0
## 138                0                1                0
## 139                1                0                0
## 140                1                0                0
## 141                0                0                0
## 142                0                1                1
## 143                1                0                0
## 144                0                0                0
## 145                0                0                0
## 146                0                0                0
## 147                0                0                0
## 148                0                0                0
## 149                0                0                0
## 150                0                0                0
## 151                0                0                0
## 152                1                0                0
## 153                1                0                0
## 154                0                0                0
## 155                0                0                0
## 156                0                0                1
## 157                0                0                0
## 158                0                0                0
## 159                0                0                0
## 160                0                1                0
## 161                0                1                0
## 162                0                0                0
## 163                0                0                0
## 164                1                0                0
## 165                0                0                0
## 166                1                0                0
## 167                0                0                0
## 168                0                0                0
## 169                0                0                0
## 170                0                0                1
## 171                1                0                0
## 172                0                0                0
## 173                0                0                0
## 174                0                0                0
## 175                1                0                0
## 176                1                0                0
## 177                0                0                0
## 178                0                0                0
## 179                0                0                0
## 180                0                0                0
## 181                0                0                0
## 182                0                0                0
## 183                0                0                0
## 184                0                0                0
```

```
## 185  0  0  0
## 186  0  0  0
## 187  0  0  0
## 188  0  0  0
## 189  0  0  0
## 190  1  0  0
## 191  0  0  0
## 192  0  0  0
## 193  0  0  0
## 194  0  0  0
## 195  0  0  0
## 196  0  0  0
## 197  0  0  0
## 198  0  0  0
## 199  0  0  0
## 200  0  0  0
## 201  0  0  0
## 202  0  0  0
## 203  0  0  0
## 204  0  0  0
## 205  0  0  0
## 206  0  0  0
## 207  0  0  0
## 208  0  0  0
## 209  0  0  0
## 210  1  0  0
## 211  0  0  0
## 212  0  0  0
## 213  0  0  0
## 214  0  0  0
## 215  0  0  0
## 216  0  0  0
## 217  0  0  0
## 218  0  0  0
## 219  0  0  0
## 220  0  0  0
## 221  0  0  0
## 222  0  0  0
## 223  0  0  0
## 224  0  0  0
## 225  0  0  0
## 226  0  0  0
## 227  0  0  0
## 228  0  0  0
## 229  0  0  0
## 230  0  0  0
## 231  0  0  0
## 232  0  0  0
## 233  0  0  0
## 234  0  0  0
## 235  0  0  0
## 236  0  0  0
## 237  0  0  0
## 238  0  0  0
## 239  0  0  0
## 240  0  0  0
## 241  0  0  0
## 242  0  0  0
```

```
## 243  0  0  0
## 244  0  0  0
## 245  0  0  0
## 246  0  0  0
## 247  0  0  0
## 248  0  0  0
## 249  0  0  0
## 250  0  0  0
## 251  0  0  0
## 252  0  0  0
## 253  0  0  0
## 254  0  0  0
## 255  0  0  0
## 256  0  0  0
## 257  0  0  0
## 258  0  0  0
## 259  0  0  0
## 260  0  0  0
## 261  0  0  0
## 262  0  0  0
## 263  0  0  0
## 264  0  0  0
## 265  0  0  0
## 266  0  0  0
## 267  0  0  0
## 268  0  0  0
## 269  0  0  0
## 270  0  0  0
## 271  0  0  0
## 272  0  0  0
## 273  0  0  0
## 274  0  0  0
## 275  0  0  0
## 276  1  0  0
## 277  1  1  1
## 278  1  0  0
## 279  1  0  0
## 280  1  0  1
## 281  0  0  1
## 282  0  0  0
## 283  0  0  1
## 284  0  1  0
## 285  1  0  0
## 286  0  0  0
## 287  0  0  0
## 288  0  0  0
## 289  0  0  0
## 290  0  0  0
## 291  0  0  0
## 292  0  0  0
## 293  0  0  0
## 294  0  0  0
## 295  0  0  0
## 296  0  0  0
## 297  0  0  0
## 298  1  1  1
## 299  0  0  0
## 300  0  0  0
```

```
##     glm_Veronica_chamaedrys glm_Taraxacum_officinale_aggr
## 1                         0                             0
## 2                         1                             1
## 3                         1                             1
## 4                         1                             1
## 5                         1                             1
## 6                         1                             1
## 7                         1                             0
## 8                         1                             1
## 9                         1                             0
## 10                        1                             1
## 11                        1                             0
## 12                        1                             1
## 13                        1                             1
## 14                        1                             1
## 15                        1                             1
## 16                        1                             1
## 17                        1                             1
## 18                        1                             1
## 19                        1                             1
## 20                        1                             1
## 21                        1                             1
## 22                        1                             1
## 23                        1                             1
## 24                        1                             0
## 25                        1                             0
## 26                        1                             0
## 27                        0                             0
## 28                        1                             0
## 29                        1                             0
## 30                        1                             1
## 31                        1                             1
## 32                        1                             1
## 33                        1                             1
## 34                        1                             1
## 35                        1                             1
## 36                        1                             1
## 37                        1                             0
## 38                        1                             1
## 39                        1                             1
## 40                        1                             1
## 41                        1                             1
## 42                        0                             1
## 43                        1                             1
## 44                        1                             1
## 45                        1                             1
## 46                        1                             1
## 47                        1                             1
## 48                        1                             1
## 49                        1                             1
## 50                        1                             1
## 51                        1                             0
## 52                        1                             1
## 53                        1                             1
## 54                        1                             1
## 55                        1                             1
## 56                        1                             1
## 57                        1                             1
```

```
## 58                    1                    1
## 59                    1                    1
## 60                    1                    0
## 61                    1                    1
## 62                    1                    0
## 63                    1                    0
## 64                    1                    0
## 65                    0                    0
## 66                    1                    0
## 67                    1                    1
## 68                    1                    0
## 69                    0                    0
## 70                    1                    0
## 71                    1                    1
## 72                    1                    1
## 73                    1                    1
## 74                    1                    1
## 75                    1                    0
## 76                    1                    1
## 77                    1                    1
## 78                    0                    1
## 79                    0                    1
## 80                    0                    1
## 81                    0                    1
## 82                    0                    1
## 83                    0                    1
## 84                    0                    0
## 85                    0                    0
## 86                    0                    0
## 87                    0                    0
## 88                    1                    1
## 89                    1                    0
## 90                    0                    0
## 91                    0                    1
## 92                    1                    1
## 93                    1                    1
## 94                    1                    1
## 95                    1                    1
## 96                    1                    0
## 97                    1                    0
## 98                    0                    1
## 99                    0                    0
## 100                   0                    1
## 101                   1                    0
## 102                   0                    0
## 103                   1                    0
## 104                   1                    0
## 105                   1                    0
## 106                   0                    0
## 107                   0                    0
## 108                   0                    0
## 109                   1                    0
## 110                   1                    0
## 111                   1                    0
## 112                   0                    0
## 113                   0                    0
## 114                   1                    0
## 115                   1                    0
```

```
## 116                    0                    0
## 117                    0                    0
## 118                    0                    1
## 119                    0                    1
## 120                    0                    1
## 121                    0                    1
## 122                    0                    1
## 123                    0                    0
## 124                    0                    0
## 125                    0                    0
## 126                    0                    0
## 127                    0                    0
## 128                    0                    1
## 129                    0                    0
## 130                    0                    1
## 131                    0                    1
## 132                    0                    0
## 133                    0                    1
## 134                    0                    1
## 135                    0                    0
## 136                    0                    0
## 137                    1                    0
## 138                    0                    1
## 139                    0                    0
## 140                    0                    0
## 141                    0                    0
## 142                    0                    0
## 143                    0                    1
## 144                    0                    0
## 145                    1                    0
## 146                    0                    0
## 147                    0                    0
## 148                    0                    0
## 149                    0                    0
## 150                    0                    0
## 151                    0                    0
## 152                    0                    0
## 153                    0                    0
## 154                    0                    0
## 155                    0                    0
## 156                    0                    0
## 157                    0                    0
## 158                    0                    1
## 159                    0                    0
## 160                    0                    0
## 161                    0                    1
## 162                    0                    0
## 163                    0                    0
## 164                    0                    1
## 165                    0                    0
## 166                    0                    0
## 167                    0                    0
## 168                    0                    0
## 169                    0                    0
## 170                    0                    0
## 171                    0                    0
## 172                    0                    1
## 173                    0                    0
```

```
## 174                0                0
## 175                0                1
## 176                0                0
## 177                0                0
## 178                0                0
## 179                0                0
## 180                0                0
## 181                0                0
## 182                0                0
## 183                0                0
## 184                0                0
## 185                0                0
## 186                0                0
## 187                0                0
## 188                0                0
## 189                1                0
## 190                0                0
## 191                0                0
## 192                1                0
## 193                0                0
## 194                0                0
## 195                0                0
## 196                0                0
## 197                0                0
## 198                0                0
## 199                0                0
## 200                0                0
## 201                0                0
## 202                0                0
## 203                0                1
## 204                0                0
## 205                0                0
## 206                0                0
## 207                0                0
## 208                0                0
## 209                0                0
## 210                0                0
## 211                0                0
## 212                0                0
## 213                0                0
## 214                0                0
## 215                0                0
## 216                0                0
## 217                0                0
## 218                0                0
## 219                0                0
## 220                0                0
## 221                0                0
## 222                0                0
## 223                0                0
## 224                0                0
## 225                0                0
## 226                0                0
## 227                0                0
## 228                0                0
## 229                0                0
## 230                0                0
## 231                1                0
```

```
## 232                0                0
## 233                0                0
## 234                0                0
## 235                0                0
## 236                0                0
## 237                0                0
## 238                0                0
## 239                0                0
## 240                0                0
## 241                0                0
## 242                0                0
## 243                0                0
## 244                0                0
## 245                0                0
## 246                0                0
## 247                0                0
## 248                0                0
## 249                0                0
## 250                0                0
## 251                0                0
## 252                0                0
## 253                0                0
## 254                0                0
## 255                0                0
## 256                0                0
## 257                0                0
## 258                0                0
## 259                0                0
## 260                0                0
## 261                0                0
## 262                0                0
## 263                0                0
## 264                0                0
## 265                0                0
## 266                0                0
## 267                0                0
## 268                0                0
## 269                0                0
## 270                0                0
## 271                0                0
## 272                0                0
## 273                0                0
## 274                0                0
## 275                0                0
## 276                1                1
## 277                1                0
## 278                1                1
## 279                0                1
## 280                0                0
## 281                0                0
## 282                0                0
## 283                0                0
## 284                0                1
## 285                0                0
## 286                0                0
## 287                0                0
## 288                0                0
## 289                0                0
```

```
## 290                       0                          0
## 291                       0                          0
## 292                       0                          0
## 293                       0                          0
## 294                       0                          0
## 295                       0                          0
## 296                       0                          0
## 297                       0                          0
## 298                       1                          0
## 299                       0                          0
## 300                       0                          0
##     glm_Plantago_lanceolata glm_Potentilla_erecta glm_Carex_sempervirens
## 1                         0                     1                      1
## 2                         1                     0                      0
## 3                         1                     0                      0
## 4                         1                     0                      0
## 5                         1                     0                      0
## 6                         1                     0                      0
## 7                         1                     0                      0
## 8                         1                     0                      0
## 9                         0                     0                      0
## 10                        1                     0                      0
## 11                        1                     0                      0
## 12                        1                     0                      0
## 13                        1                     0                      0
## 14                        1                     0                      0
## 15                        1                     0                      0
## 16                        1                     0                      0
## 17                        1                     0                      0
## 18                        1                     0                      0
## 19                        1                     0                      0
## 20                        1                     0                      0
## 21                        1                     0                      0
## 22                        1                     0                      0
## 23                        1                     0                      0
## 24                        1                     0                      0
## 25                        0                     0                      0
## 26                        0                     0                      0
## 27                        0                     0                      0
## 28                        1                     0                      0
## 29                        0                     0                      0
## 30                        1                     0                      0
## 31                        1                     0                      0
## 32                        1                     1                      0
## 33                        1                     0                      0
## 34                        1                     0                      0
## 35                        1                     0                      0
## 36                        1                     1                      0
## 37                        1                     0                      0
## 38                        1                     1                      0
## 39                        1                     0                      0
## 40                        1                     0                      0
## 41                        0                     0                      0
## 42                        0                     0                      0
## 43                        0                     0                      0
## 44                        0                     0                      0
## 45                        1                     0                      0
## 46                        0                     0                      0
```

```
## 47                0                0                0
## 48                0                0                0
## 49                0                0                0
## 50                1                0                0
## 51                0                0                0
## 52                0                0                0
## 53                1                0                0
## 54                1                0                0
## 55                1                0                0
## 56                1                0                0
## 57                1                0                0
## 58                1                0                0
## 59                1                0                0
## 60                0                0                0
## 61                1                0                0
## 62                0                0                0
## 63                0                0                0
## 64                0                0                0
## 65                0                1                0
## 66                0                0                0
## 67                1                1                0
## 68                1                0                0
## 69                1                1                0
## 70                1                1                0
## 71                1                0                0
## 72                1                1                0
## 73                1                1                0
## 74                1                1                0
## 75                1                1                0
## 76                1                0                0
## 77                1                0                0
## 78                0                0                0
## 79                0                0                0
## 80                0                0                0
## 81                0                0                0
## 82                0                0                0
## 83                0                0                0
## 84                0                0                0
## 85                0                0                0
## 86                0                0                0
## 87                0                0                0
## 88                1                0                0
## 89                0                0                0
## 90                0                0                0
## 91                0                0                0
## 92                1                0                0
## 93                1                0                0
## 94                1                0                0
## 95                1                0                0
## 96                0                0                0
## 97                1                1                0
## 98                0                0                0
## 99                0                0                0
## 100               0                0                0
## 101               1                0                0
## 102               0                0                0
## 103               0                0                0
## 104               1                1                0
```

```
## 105                1                0                0
## 106                0                1                0
## 107                0                0                1
## 108                0                0                0
## 109                1                1                0
## 110                1                1                0
## 111                1                1                0
## 112                1                1                0
## 113                1                1                0
## 114                1                1                0
## 115                1                1                0
## 116                0                0                0
## 117                0                1                0
## 118                0                0                0
## 119                0                0                0
## 120                0                0                0
## 121                0                0                0
## 122                0                0                0
## 123                0                0                0
## 124                0                0                0
## 125                0                0                0
## 126                0                0                0
## 127                0                0                0
## 128                0                0                0
## 129                0                0                0
## 130                1                0                0
## 131                0                0                0
## 132                0                0                1
## 133                0                0                0
## 134                1                0                0
## 135                0                0                1
## 136                1                0                1
## 137                0                0                0
## 138                0                0                0
## 139                1                0                0
## 140                0                0                0
## 141                0                0                0
## 142                0                0                0
## 143                0                0                0
## 144                0                0                0
## 145                1                1                0
## 146                0                0                1
## 147                0                1                1
## 148                0                0                1
## 149                1                0                1
## 150                1                0                1
## 151                1                1                1
## 152                1                0                0
## 153                0                0                0
## 154                1                1                1
## 155                0                1                0
## 156                0                0                0
## 157                0                0                0
## 158                0                0                0
## 159                0                0                0
## 160                0                0                0
## 161                0                0                0
## 162                0                0                0
```

```
## 163  0  0  0
## 164  0  0  0
## 165  0  0  0
## 166  0  0  0
## 167  0  0  1
## 168  0  0  1
## 169  0  0  1
## 170  0  0  0
## 171  0  0  0
## 172  0  0  1
## 173  0  0  1
## 174  0  0  1
## 175  0  0  0
## 176  0  0  0
## 177  0  0  0
## 178  0  0  1
## 179  0  0  1
## 180  0  0  1
## 181  0  0  0
## 182  0  0  0
## 183  0  0  0
## 184  0  0  0
## 185  0  0  1
## 186  0  0  1
## 187  0  0  1
## 188  0  0  1
## 189  0  0  0
## 190  0  1  0
## 191  0  0  1
## 192  1  0  1
## 193  0  0  1
## 194  0  0  0
## 195  0  0  1
## 196  0  1  0
## 197  0  0  1
## 198  0  0  1
## 199  0  0  0
## 200  0  0  1
## 201  0  0  0
## 202  0  0  1
## 203  1  1  0
## 204  0  0  1
## 205  0  0  0
## 206  0  0  0
## 207  0  0  1
## 208  0  0  0
## 209  0  0  1
## 210  0  0  1
## 211  0  0  0
## 212  0  0  1
## 213  0  0  1
## 214  0  0  1
## 215  0  0  0
## 216  1  0  1
## 217  0  0  1
## 218  0  0  0
## 219  0  0  1
## 220  0  0  1
```

```
## 221  0  0  1
## 222  0  0  1
## 223  0  0  0
## 224  0  0  0
## 225  0  0  0
## 226  0  0  1
## 227  0  0  0
## 228  0  0  1
## 229  0  0  1
## 230  0  0  1
## 231  0  0  0
## 232  0  0  1
## 233  0  0  1
## 234  0  0  1
## 235  0  0  1
## 236  0  0  1
## 237  0  0  0
## 238  0  0  0
## 239  0  0  1
## 240  0  0  1
## 241  0  0  1
## 242  0  0  1
## 243  0  0  1
## 244  0  0  1
## 245  0  0  1
## 246  0  0  1
## 247  0  0  1
## 248  0  0  1
## 249  0  0  1
## 250  0  0  1
## 251  0  0  1
## 252  0  0  1
## 253  0  0  1
## 254  0  0  0
## 255  0  0  1
## 256  0  0  1
## 257  0  0  1
## 258  0  0  0
## 259  0  0  1
## 260  0  0  1
## 261  0  0  1
## 262  0  0  0
## 263  0  0  1
## 264  0  0  1
## 265  0  0  1
## 266  0  0  0
## 267  0  0  0
## 268  0  0  0
## 269  0  0  1
## 270  0  0  1
## 271  0  0  1
## 272  0  0  1
## 273  0  0  1
## 274  0  0  1
## 275  0  0  1
## 276  1  1  0
## 277  0  0  0
## 278  1  1  0
```

```
## 279                      1                      0                      0
## 280                      0                      0                      0
## 281                      0                      0                      0
## 282                      0                      0                      0
## 283                      0                      0                      0
## 284                      0                      0                      0
## 285                      0                      0                      0
## 286                      0                      0                      0
## 287                      0                      0                      1
## 288                      0                      0                      1
## 289                      0                      0                      1
## 290                      0                      0                      1
## 291                      0                      0                      1
## 292                      0                      0                      1
## 293                      0                      0                      1
## 294                      0                      0                      1
## 295                      0                      0                      1
## 296                      0                      0                      1
## 297                      0                      0                      1
## 298                      1                      0                      0
## 299                      0                      0                      0
## 300                      0                      0                      1
##     glm_Soldanella_alpina glm_Cynosurus_cristatus
## 1                       0                       0
## 2                       0                       1
## 3                       0                       1
## 4                       0                       1
## 5                       0                       1
## 6                       0                       1
## 7                       0                       0
## 8                       0                       1
## 9                       0                       0
## 10                      0                       1
## 11                      0                       1
## 12                      0                       1
## 13                      0                       1
## 14                      0                       0
## 15                      0                       1
## 16                      0                       1
## 17                      0                       1
## 18                      0                       1
## 19                      0                       1
## 20                      0                       1
## 21                      0                       1
## 22                      0                       0
## 23                      0                       1
## 24                      0                       1
## 25                      0                       1
## 26                      0                       0
## 27                      0                       1
## 28                      0                       0
## 29                      0                       0
## 30                      0                       1
## 31                      0                       0
## 32                      0                       0
## 33                      0                       1
## 34                      0                       0
## 35                      0                       1
```

```
## 36                   0                   0
## 37                   0                   1
## 38                   0                   0
## 39                   0                   0
## 40                   0                   1
## 41                   0                   1
## 42                   0                   0
## 43                   0                   1
## 44                   0                   1
## 45                   0                   0
## 46                   0                   0
## 47                   0                   1
## 48                   0                   0
## 49                   0                   1
## 50                   0                   0
## 51                   0                   1
## 52                   0                   1
## 53                   0                   1
## 54                   0                   1
## 55                   0                   1
## 56                   0                   1
## 57                   0                   0
## 58                   0                   0
## 59                   0                   1
## 60                   0                   0
## 61                   0                   1
## 62                   0                   1
## 63                   0                   0
## 64                   0                   0
## 65                   0                   0
## 66                   0                   0
## 67                   0                   0
## 68                   0                   1
## 69                   0                   0
## 70                   0                   0
## 71                   0                   0
## 72                   0                   0
## 73                   0                   0
## 74                   0                   0
## 75                   0                   0
## 76                   0                   1
## 77                   0                   0
## 78                   0                   0
## 79                   0                   0
## 80                   0                   1
## 81                   0                   0
## 82                   1                   0
## 83                   0                   0
## 84                   0                   1
## 85                   0                   0
## 86                   0                   0
## 87                   0                   0
## 88                   0                   0
## 89                   0                   0
## 90                   0                   0
## 91                   0                   0
## 92                   0                   0
## 93                   0                   0
```

```
## 94                   0                   0
## 95                   0                   0
## 96                   0                   0
## 97                   0                   0
## 98                   0                   0
## 99                   0                   0
## 100                  0                   0
## 101                  0                   0
## 102                  0                   0
## 103                  0                   0
## 104                  0                   0
## 105                  0                   0
## 106                  0                   0
## 107                  0                   0
## 108                  0                   0
## 109                  0                   0
## 110                  0                   0
## 111                  0                   0
## 112                  0                   0
## 113                  0                   0
## 114                  0                   0
## 115                  0                   0
## 116                  0                   0
## 117                  0                   0
## 118                  1                   0
## 119                  1                   0
## 120                  1                   0
## 121                  0                   0
## 122                  0                   0
## 123                  1                   0
## 124                  0                   0
## 125                  1                   0
## 126                  1                   0
## 127                  1                   0
## 128                  0                   0
## 129                  0                   0
## 130                  0                   0
## 131                  0                   0
## 132                  0                   0
## 133                  0                   0
## 134                  0                   0
## 135                  0                   0
## 136                  0                   0
## 137                  0                   0
## 138                  0                   0
## 139                  0                   0
## 140                  1                   0
## 141                  1                   0
## 142                  0                   0
## 143                  0                   0
## 144                  1                   0
## 145                  0                   0
## 146                  0                   0
## 147                  0                   0
## 148                  0                   0
## 149                  0                   0
## 150                  0                   0
## 151                  0                   0
```

```
## 152                  0                  0
## 153                  1                  0
## 154                  0                  0
## 155                  1                  0
## 156                  1                  0
## 157                  1                  0
## 158                  1                  0
## 159                  1                  0
## 160                  1                  0
## 161                  0                  0
## 162                  1                  0
## 163                  1                  0
## 164                  1                  0
## 165                  1                  0
## 166                  1                  0
## 167                  0                  0
## 168                  1                  0
## 169                  0                  0
## 170                  1                  0
## 171                  1                  0
## 172                  0                  0
## 173                  0                  0
## 174                  1                  0
## 175                  0                  0
## 176                  1                  0
## 177                  1                  0
## 178                  1                  0
## 179                  0                  0
## 180                  1                  0
## 181                  1                  0
## 182                  1                  0
## 183                  1                  0
## 184                  1                  0
## 185                  1                  0
## 186                  0                  0
## 187                  0                  0
## 188                  1                  0
## 189                  0                  0
## 190                  0                  0
## 191                  0                  0
## 192                  0                  0
## 193                  0                  0
## 194                  1                  0
## 195                  1                  0
## 196                  0                  0
## 197                  1                  0
## 198                  1                  0
## 199                  1                  0
## 200                  1                  0
## 201                  1                  0
## 202                  1                  0
## 203                  0                  0
## 204                  1                  0
## 205                  1                  0
## 206                  1                  0
## 207                  1                  0
## 208                  1                  0
## 209                  0                  0
```

```
## 210                0                0
## 211                1                0
## 212                1                0
## 213                0                0
## 214                1                0
## 215                1                0
## 216                0                0
## 217                0                0
## 218                1                0
## 219                1                0
## 220                1                0
## 221                1                0
## 222                1                0
## 223                1                0
## 224                1                0
## 225                1                0
## 226                1                0
## 227                1                0
## 228                1                0
## 229                1                0
## 230                0                0
## 231                0                0
## 232                1                0
## 233                1                0
## 234                0                0
## 235                1                0
## 236                1                0
## 237                1                0
## 238                1                0
## 239                0                0
## 240                1                0
## 241                1                0
## 242                1                0
## 243                0                0
## 244                0                0
## 245                1                0
## 246                0                0
## 247                0                0
## 248                1                0
## 249                0                0
## 250                0                0
## 251                0                0
## 252                0                0
## 253                0                0
## 254                1                0
## 255                1                0
## 256                0                0
## 257                1                0
## 258                1                0
## 259                0                0
## 260                1                0
## 261                0                0
## 262                0                0
## 263                0                0
## 264                0                0
## 265                1                0
## 266                1                0
## 267                0                0
```

```
## 268                     0                     0
## 269                     1                     0
## 270                     0                     0
## 271                     1                     0
## 272                     0                     0
## 273                     1                     0
## 274                     0                     0
## 275                     0                     0
## 276                     0                     0
## 277                     0                     0
## 278                     0                     0
## 279                     0                     0
## 280                     0                     0
## 281                     0                     0
## 282                     1                     0
## 283                     1                     0
## 284                     0                     0
## 285                     1                     0
## 286                     0                     0
## 287                     1                     0
## 288                     0                     0
## 289                     1                     0
## 290                     0                     0
## 291                     0                     0
## 292                     0                     0
## 293                     1                     0
## 294                     0                     0
## 295                     0                     0
## 296                     1                     0
## 297                     1                     0
## 298                     0                     0
## 299                     0                     0
## 300                     0                     0
##     glm_Campanula_scheuchzeri glm_Festuca_pratensis_sl
## 1                           0                       0
## 2                           0                       0
## 3                           0                       0
## 4                           0                       0
## 5                           0                       0
## 6                           0                       1
## 7                           0                       1
## 8                           0                       1
## 9                           0                       1
## 10                          0                       1
## 11                          0                       1
## 12                          0                       1
## 13                          0                       1
## 14                          0                       1
## 15                          0                       1
## 16                          0                       1
## 17                          0                       0
## 18                          0                       0
## 19                          0                       1
## 20                          0                       1
## 21                          0                       1
## 22                          0                       1
## 23                          0                       0
## 24                          0                       1
```

```
## 25                    0                    1
## 26                    0                    1
## 27                    0                    1
## 28                    0                    1
## 29                    0                    1
## 30                    0                    1
## 31                    0                    1
## 32                    0                    1
## 33                    0                    0
## 34                    0                    1
## 35                    0                    0
## 36                    0                    1
## 37                    0                    1
## 38                    0                    0
## 39                    0                    1
## 40                    0                    0
## 41                    0                    0
## 42                    0                    0
## 43                    0                    0
## 44                    0                    0
## 45                    0                    0
## 46                    0                    0
## 47                    0                    1
## 48                    0                    0
## 49                    0                    0
## 50                    0                    0
## 51                    0                    1
## 52                    0                    0
## 53                    0                    0
## 54                    0                    0
## 55                    0                    0
## 56                    0                    0
## 57                    0                    0
## 58                    0                    0
## 59                    0                    1
## 60                    0                    0
## 61                    0                    1
## 62                    0                    1
## 63                    0                    1
## 64                    0                    1
## 65                    0                    0
## 66                    0                    1
## 67                    0                    0
## 68                    0                    1
## 69                    0                    0
## 70                    0                    0
## 71                    0                    0
## 72                    0                    1
## 73                    0                    0
## 74                    0                    0
## 75                    0                    1
## 76                    0                    1
## 77                    0                    1
## 78                    0                    0
## 79                    0                    0
## 80                    0                    0
## 81                    0                    0
## 82                    0                    0
```

```
## 83                    0                    0
## 84                    0                    0
## 85                    0                    0
## 86                    0                    0
## 87                    0                    0
## 88                    0                    0
## 89                    0                    0
## 90                    0                    0
## 91                    0                    0
## 92                    0                    0
## 93                    0                    0
## 94                    0                    0
## 95                    0                    0
## 96                    0                    0
## 97                    0                    0
## 98                    0                    0
## 99                    0                    0
## 100                   0                    0
## 101                   0                    0
## 102                   0                    0
## 103                   0                    0
## 104                   0                    0
## 105                   0                    0
## 106                   0                    0
## 107                   1                    0
## 108                   0                    0
## 109                   0                    0
## 110                   0                    0
## 111                   0                    0
## 112                   0                    0
## 113                   0                    0
## 114                   0                    0
## 115                   0                    0
## 116                   0                    0
## 117                   0                    0
## 118                   0                    0
## 119                   0                    0
## 120                   0                    0
## 121                   0                    0
## 122                   0                    0
## 123                   1                    0
## 124                   0                    0
## 125                   1                    0
## 126                   0                    0
## 127                   0                    0
## 128                   0                    0
## 129                   0                    0
## 130                   0                    0
## 131                   0                    0
## 132                   0                    0
## 133                   0                    0
## 134                   0                    0
## 135                   1                    0
## 136                   0                    0
## 137                   0                    0
## 138                   0                    0
## 139                   0                    0
## 140                   0                    0
```

```
## 141                1                0
## 142                0                0
## 143                0                0
## 144                0                0
## 145                0                0
## 146                1                0
## 147                0                0
## 148                0                0
## 149                1                0
## 150                1                0
## 151                0                0
## 152                0                0
## 153                0                0
## 154                0                0
## 155                0                0
## 156                0                0
## 157                1                0
## 158                0                0
## 159                1                0
## 160                0                0
## 161                0                0
## 162                1                0
## 163                1                0
## 164                0                0
## 165                0                0
## 166                0                0
## 167                0                0
## 168                1                0
## 169                1                0
## 170                0                0
## 171                1                0
## 172                1                0
## 173                1                0
## 174                1                0
## 175                0                0
## 176                1                0
## 177                1                0
## 178                1                0
## 179                1                0
## 180                1                0
## 181                1                0
## 182                0                0
## 183                0                0
## 184                1                0
## 185                1                0
## 186                1                0
## 187                1                0
## 188                1                0
## 189                0                0
## 190                0                0
## 191                1                0
## 192                0                0
## 193                1                0
## 194                0                0
## 195                1                0
## 196                0                0
## 197                1                0
## 198                1                0
```

```
## 199                1                0
## 200                1                0
## 201                1                0
## 202                1                0
## 203                0                0
## 204                1                0
## 205                0                0
## 206                1                0
## 207                1                0
## 208                1                0
## 209                0                0
## 210                1                0
## 211                1                0
## 212                1                0
## 213                1                0
## 214                1                0
## 215                1                0
## 216                0                0
## 217                1                0
## 218                1                0
## 219                1                0
## 220                1                0
## 221                1                0
## 222                1                0
## 223                0                0
## 224                1                0
## 225                1                0
## 226                1                0
## 227                1                0
## 228                1                0
## 229                1                0
## 230                1                0
## 231                0                0
## 232                1                0
## 233                1                0
## 234                1                0
## 235                1                0
## 236                1                0
## 237                1                0
## 238                1                0
## 239                1                0
## 240                1                0
## 241                1                0
## 242                1                0
## 243                1                0
## 244                1                0
## 245                1                0
## 246                1                0
## 247                1                0
## 248                1                0
## 249                1                0
## 250                1                0
## 251                1                0
## 252                0                0
## 253                0                0
## 254                0                0
## 255                1                0
## 256                1                0
```

```
## 257                          1                          0
## 258                          1                          0
## 259                          1                          0
## 260                          1                          0
## 261                          1                          0
## 262                          1                          0
## 263                          1                          0
## 264                          1                          0
## 265                          1                          0
## 266                          1                          0
## 267                          1                          0
## 268                          1                          0
## 269                          1                          0
## 270                          1                          0
## 271                          1                          0
## 272                          1                          0
## 273                          1                          0
## 274                          1                          0
## 275                          1                          0
## 276                          0                          0
## 277                          0                          0
## 278                          0                          0
## 279                          0                          0
## 280                          0                          0
## 281                          0                          0
## 282                          1                          0
## 283                          0                          0
## 284                          0                          0
## 285                          0                          0
## 286                          1                          0
## 287                          1                          0
## 288                          1                          0
## 289                          1                          0
## 290                          1                          0
## 291                          1                          0
## 292                          1                          0
## 293                          1                          0
## 294                          1                          0
## 295                          1                          0
## 296                          1                          0
## 297                          1                          0
## 298                          0                          1
## 299                          1                          0
## 300                          0                          0
##     glm_Bromus_erectus_sstr glm_Saxifraga_oppositifolia glm_Daucus_carota
## 1                         0                           0                 0
## 2                         0                           0                 0
## 3                         0                           0                 0
## 4                         0                           0                 0
## 5                         0                           0                 0
## 6                         0                           0                 0
## 7                         0                           0                 0
## 8                         0                           0                 0
## 9                         0                           0                 0
## 10                        0                           0                 0
## 11                        0                           0                 0
## 12                        1                           0                 0
## 13                        0                           0                 0
```

```
## 14                0                 0                 0
## 15                0                 0                 0
## 16                1                 0                 1
## 17                0                 0                 0
## 18                0                 0                 0
## 19                1                 0                 1
## 20                1                 0                 1
## 21                0                 0                 0
## 22                1                 0                 1
## 23                0                 0                 0
## 24                0                 0                 0
## 25                0                 0                 0
## 26                0                 0                 0
## 27                0                 0                 0
## 28                0                 0                 0
## 29                0                 0                 0
## 30                0                 0                 0
## 31                1                 0                 1
## 32                0                 0                 0
## 33                0                 0                 0
## 34                1                 0                 1
## 35                0                 0                 0
## 36                1                 0                 1
## 37                1                 0                 1
## 38                1                 0                 1
## 39                0                 0                 0
## 40                0                 0                 0
## 41                0                 0                 0
## 42                0                 0                 0
## 43                0                 0                 0
## 44                0                 0                 0
## 45                0                 0                 0
## 46                0                 0                 0
## 47                0                 0                 0
## 48                0                 0                 0
## 49                0                 0                 0
## 50                0                 0                 0
## 51                0                 0                 0
## 52                0                 0                 0
## 53                0                 0                 0
## 54                0                 0                 0
## 55                0                 0                 0
## 56                0                 0                 0
## 57                0                 0                 0
## 58                0                 0                 0
## 59                0                 0                 0
## 60                0                 0                 0
## 61                1                 0                 0
## 62                0                 0                 0
## 63                0                 0                 0
## 64                0                 0                 0
## 65                0                 0                 0
## 66                0                 0                 0
## 67                0                 0                 0
## 68                1                 0                 1
## 69                0                 0                 0
## 70                0                 0                 0
## 71                1                 0                 0
```

```
## 72                1                 0                 1
## 73                1                 0                 1
## 74                0                 0                 0
## 75                1                 0                 0
## 76                1                 0                 0
## 77                0                 0                 0
## 78                0                 0                 0
## 79                0                 0                 0
## 80                0                 0                 0
## 81                0                 0                 0
## 82                0                 0                 0
## 83                0                 0                 0
## 84                0                 0                 0
## 85                0                 0                 0
## 86                0                 0                 0
## 87                0                 0                 0
## 88                0                 0                 0
## 89                0                 0                 0
## 90                0                 0                 0
## 91                0                 0                 0
## 92                0                 0                 0
## 93                0                 0                 0
## 94                0                 0                 0
## 95                0                 0                 0
## 96                0                 0                 0
## 97                0                 0                 0
## 98                0                 0                 0
## 99                0                 0                 0
## 100               0                 0                 0
## 101               0                 0                 0
## 102               0                 0                 0
## 103               0                 0                 0
## 104               0                 0                 0
## 105               0                 0                 0
## 106               0                 0                 0
## 107               0                 0                 0
## 108               0                 0                 0
## 109               0                 0                 0
## 110               1                 0                 0
## 111               0                 0                 0
## 112               0                 0                 0
## 113               0                 0                 0
## 114               0                 0                 0
## 115               0                 0                 0
## 116               0                 0                 0
## 117               0                 0                 0
## 118               0                 0                 0
## 119               0                 0                 0
## 120               0                 0                 0
## 121               0                 0                 0
## 122               0                 0                 0
## 123               0                 0                 0
## 124               0                 0                 0
## 125               0                 0                 0
## 126               0                 0                 0
## 127               0                 0                 0
## 128               0                 0                 0
## 129               0                 0                 0
```

```
## 130                0                0                0
## 131                0                0                0
## 132                0                0                0
## 133                0                0                0
## 134                0                0                0
## 135                0                0                0
## 136                0                0                0
## 137                0                0                0
## 138                0                0                0
## 139                0                0                0
## 140                0                0                0
## 141                0                0                0
## 142                0                0                0
## 143                0                0                0
## 144                0                0                0
## 145                1                0                1
## 146                0                0                0
## 147                0                0                0
## 148                0                0                0
## 149                0                0                0
## 150                0                0                0
## 151                0                0                0
## 152                0                0                0
## 153                0                0                0
## 154                0                0                0
## 155                0                0                0
## 156                0                0                0
## 157                0                0                0
## 158                0                0                0
## 159                0                0                0
## 160                0                0                0
## 161                0                0                0
## 162                0                0                0
## 163                0                0                0
## 164                0                0                0
## 165                0                0                0
## 166                0                0                0
## 167                0                0                0
## 168                0                0                0
## 169                0                0                0
## 170                0                0                0
## 171                0                0                0
## 172                0                0                0
## 173                0                0                0
## 174                0                0                0
## 175                0                0                0
## 176                0                0                0
## 177                0                0                0
## 178                0                0                0
## 179                0                0                0
## 180                0                0                0
## 181                0                0                0
## 182                0                0                0
## 183                0                0                0
## 184                0                0                0
## 185                0                0                0
## 186                0                0                0
## 187                0                0                0
```

```
## 188                0                0                0
## 189                0                0                0
## 190                0                0                0
## 191                0                0                0
## 192                0                0                0
## 193                0                0                0
## 194                0                0                0
## 195                0                0                0
## 196                0                0                0
## 197                0                0                0
## 198                0                0                0
## 199                0                0                0
## 200                0                0                0
## 201                0                0                0
## 202                0                0                0
## 203                0                0                0
## 204                0                0                0
## 205                0                0                0
## 206                0                0                0
## 207                0                0                0
## 208                0                0                0
## 209                0                0                0
## 210                0                0                0
## 211                0                0                0
## 212                0                0                0
## 213                0                0                0
## 214                0                0                0
## 215                0                0                0
## 216                0                0                0
## 217                0                0                0
## 218                0                0                0
## 219                0                0                0
## 220                0                0                0
## 221                0                0                0
## 222                0                0                0
## 223                0                0                0
## 224                0                0                0
## 225                0                0                0
## 226                0                0                0
## 227                0                0                0
## 228                0                0                0
## 229                0                0                0
## 230                0                0                0
## 231                0                0                0
## 232                0                0                0
## 233                0                0                0
## 234                0                0                0
## 235                0                0                0
## 236                0                1                0
## 237                0                0                0
## 238                0                0                0
## 239                0                0                0
## 240                0                0                0
## 241                0                0                0
## 242                0                0                0
## 243                0                0                0
## 244                0                0                0
## 245                0                0                0
```

```
## 246                       0                       0                0
## 247                       0                       0                0
## 248                       0                       1                0
## 249                       0                       0                0
## 250                       0                       0                0
## 251                       0                       0                0
## 252                       0                       0                0
## 253                       0                       1                0
## 254                       0                       1                0
## 255                       0                       0                0
## 256                       0                       1                0
## 257                       0                       0                0
## 258                       0                       1                0
## 259                       0                       1                0
## 260                       0                       0                0
## 261                       0                       1                0
## 262                       0                       1                0
## 263                       0                       1                0
## 264                       0                       1                0
## 265                       0                       0                0
## 266                       0                       1                0
## 267                       0                       1                0
## 268                       0                       1                0
## 269                       0                       1                0
## 270                       0                       1                0
## 271                       0                       1                0
## 272                       0                       1                0
## 273                       0                       1                0
## 274                       0                       1                0
## 275                       0                       1                0
## 276                       0                       0                0
## 277                       0                       0                0
## 278                       1                       0                1
## 279                       0                       0                0
## 280                       0                       0                0
## 281                       0                       0                0
## 282                       0                       0                0
## 283                       0                       0                0
## 284                       0                       0                0
## 285                       0                       0                0
## 286                       0                       0                0
## 287                       0                       0                0
## 288                       0                       0                0
## 289                       0                       0                0
## 290                       0                       0                0
## 291                       0                       0                0
## 292                       0                       0                0
## 293                       0                       0                0
## 294                       0                       0                0
## 295                       0                       0                0
## 296                       0                       0                0
## 297                       0                       1                0
## 298                       0                       0                0
## 299                       0                       1                0
## 300                       0                       1                0
##     glm_Pritzelago_alpina_sstr
## 1                            0
## 2                            0
```

```
## 3                    0
## 4                    0
## 5                    0
## 6                    0
## 7                    0
## 8                    0
## 9                    0
## 10                   0
## 11                   0
## 12                   0
## 13                   0
## 14                   0
## 15                   0
## 16                   0
## 17                   0
## 18                   0
## 19                   0
## 20                   0
## 21                   0
## 22                   0
## 23                   0
## 24                   0
## 25                   0
## 26                   0
## 27                   0
## 28                   0
## 29                   0
## 30                   0
## 31                   0
## 32                   0
## 33                   0
## 34                   0
## 35                   0
## 36                   0
## 37                   0
## 38                   0
## 39                   0
## 40                   0
## 41                   0
## 42                   0
## 43                   0
## 44                   0
## 45                   0
## 46                   0
## 47                   0
## 48                   0
## 49                   0
## 50                   0
## 51                   0
## 52                   0
## 53                   0
## 54                   0
## 55                   0
## 56                   0
## 57                   0
## 58                   0
## 59                   0
## 60                   0
```

```
## 61                          0
## 62                          0
## 63                          0
## 64                          0
## 65                          0
## 66                          0
## 67                          0
## 68                          0
## 69                          0
## 70                          0
## 71                          0
## 72                          0
## 73                          0
## 74                          0
## 75                          0
## 76                          0
## 77                          0
## 78                          0
## 79                          0
## 80                          0
## 81                          0
## 82                          0
## 83                          0
## 84                          0
## 85                          0
## 86                          0
## 87                          0
## 88                          0
## 89                          0
## 90                          0
## 91                          0
## 92                          0
## 93                          0
## 94                          0
## 95                          0
## 96                          0
## 97                          0
## 98                          0
## 99                          0
## 100                         0
## 101                         0
## 102                         0
## 103                         0
## 104                         0
## 105                         0
## 106                         0
## 107                         0
## 108                         0
## 109                         0
## 110                         0
## 111                         0
## 112                         0
## 113                         0
## 114                         0
## 115                         0
## 116                         0
## 117                         0
## 118                         0
```

```
## 119                    0
## 120                    0
## 121                    0
## 122                    0
## 123                    0
## 124                    0
## 125                    0
## 126                    0
## 127                    0
## 128                    0
## 129                    0
## 130                    0
## 131                    0
## 132                    0
## 133                    0
## 134                    0
## 135                    0
## 136                    0
## 137                    0
## 138                    0
## 139                    0
## 140                    0
## 141                    0
## 142                    0
## 143                    0
## 144                    0
## 145                    0
## 146                    0
## 147                    0
## 148                    0
## 149                    0
## 150                    0
## 151                    0
## 152                    0
## 153                    0
## 154                    0
## 155                    0
## 156                    0
## 157                    0
## 158                    0
## 159                    0
## 160                    0
## 161                    0
## 162                    0
## 163                    0
## 164                    0
## 165                    0
## 166                    0
## 167                    0
## 168                    0
## 169                    0
## 170                    0
## 171                    0
## 172                    0
## 173                    0
## 174                    0
## 175                    0
## 176                    0
```

```
## 177                    1
## 178                    0
## 179                    0
## 180                    0
## 181                    0
## 182                    0
## 183                    0
## 184                    0
## 185                    0
## 186                    0
## 187                    0
## 188                    0
## 189                    0
## 190                    0
## 191                    0
## 192                    0
## 193                    0
## 194                    0
## 195                    0
## 196                    0
## 197                    0
## 198                    0
## 199                    1
## 200                    0
## 201                    0
## 202                    0
## 203                    0
## 204                    0
## 205                    0
## 206                    0
## 207                    0
## 208                    0
## 209                    0
## 210                    0
## 211                    1
## 212                    0
## 213                    0
## 214                    0
## 215                    0
## 216                    0
## 217                    0
## 218                    0
## 219                    0
## 220                    0
## 221                    0
## 222                    0
## 223                    1
## 224                    0
## 225                    0
## 226                    0
## 227                    0
## 228                    1
## 229                    0
## 230                    0
## 231                    0
## 232                    0
## 233                    0
## 234                    0
```

```
## 235                    1
## 236                    0
## 237                    1
## 238                    1
## 239                    0
## 240                    0
## 241                    1
## 242                    0
## 243                    0
## 244                    0
## 245                    0
## 246                    0
## 247                    1
## 248                    0
## 249                    0
## 250                    0
## 251                    0
## 252                    0
## 253                    0
## 254                    1
## 255                    0
## 256                    0
## 257                    0
## 258                    1
## 259                    0
## 260                    0
## 261                    0
## 262                    1
## 263                    0
## 264                    1
## 265                    1
## 266                    1
## 267                    1
## 268                    1
## 269                    0
## 270                    0
## 271                    0
## 272                    0
## 273                    0
## 274                    1
## 275                    0
## 276                    0
## 277                    0
## 278                    0
## 279                    0
## 280                    0
## 281                    0
## 282                    0
## 283                    0
## 284                    0
## 285                    0
## 286                    0
## 287                    0
## 288                    0
## 289                    0
## 290                    0
## 291                    0
## 292                    0
```

```
## 293                          0
## 294                          0
## 295                          0
## 296                          0
## 297                          0
## 298                          0
## 299                          1
## 300                          0
```

4 Post-Modelling

4.1 Spatial Predictions of species assamblages

4.1.1 Co-occurrence analysis & Environmentally Constrained Null Models

Input data as a matrix of plots (rows) x species (columns). Input matrices should have column names (species names) and row names (sampling plots).

```
presence<-ecospat.testData[c(53,62,58,70,61,66,65,71,69,43,63,56,68,57,55,60,54,67,59,64)]
pred<-ecospat.testData[c(73:92)]
```

Define the number of permutations. It is recomended to use at least 10000 permutatiobns for the test. As an example we used nperm = 100, to reduce the computational time.

```
nbpermut <- 100
```

Define the outpath

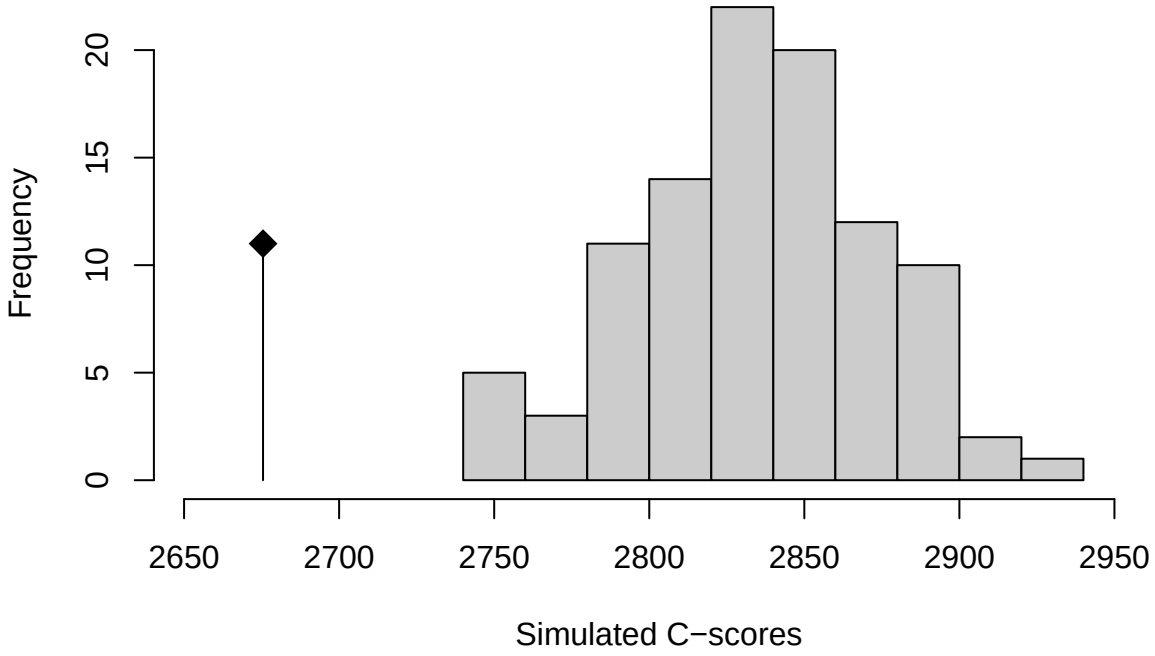
```
outpath <- getwd()
```

Run the function *ecospat.cons_Cscore*

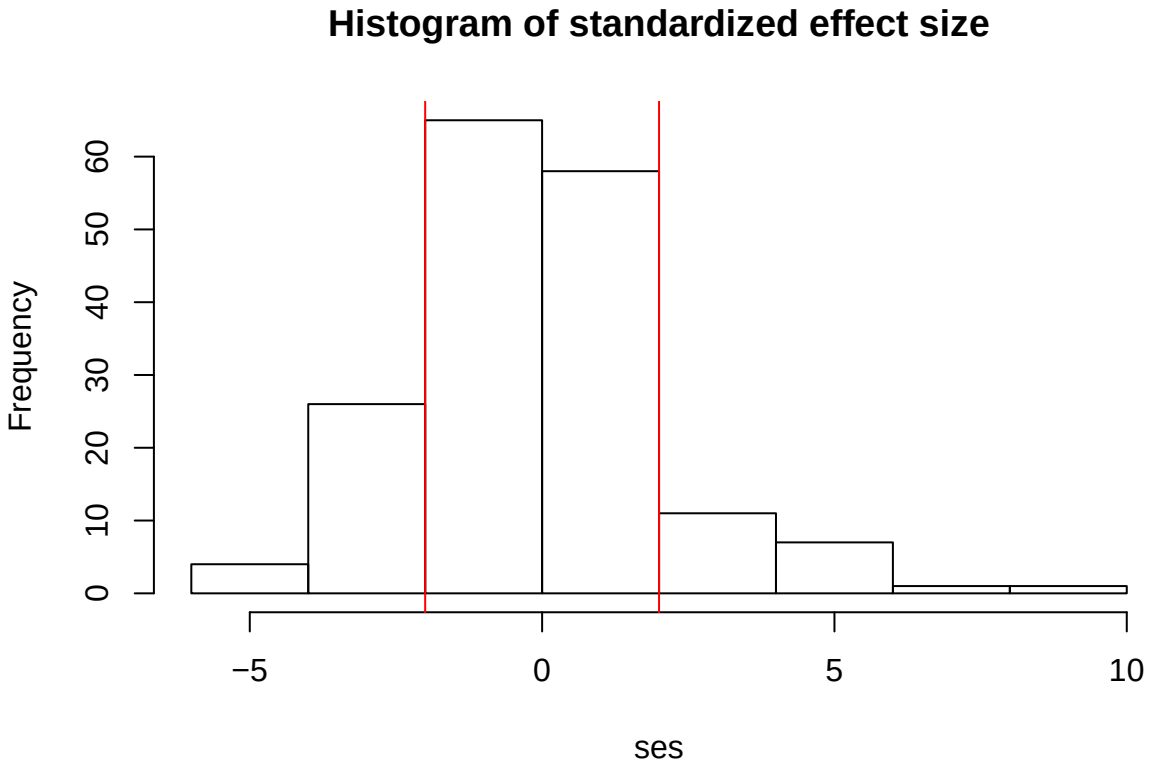
The function tests for non-random patterns of species co-occurrence in a presence-absence matrix. It calculates the C-score index for the whole community and for each species pair. An environmental constraint is applied during the generation of the null communities.

```
ecospat.cons_Cscore(presence, pred, nbpermut, outpath)
```

```
## Computing observed co-occurence matrix
## ............
## ............
## ............
## Computing permutations
## ............
## ............
## ............
```




```
## Permutations finished Wed Nov  2 16:14:32 2016
## ..............
## ..............
## Exporting dataset
## ..............
## ..............
## ..............
```




```
## $ObsCscoreTot
## [1] 2675.468
##
## $SimCscoreTot
## [1] 2834.858
```

```
##
## $PVal.less
## [1] 0.00990099
##
## $PVal.greater
## [1] 1
##
## $SES.Tot
## [1] -4.12709
```

The function returns - the C-score index for the observed community (ObsCscoreTot), - the mean of C-score for the simulated communities (SimCscoreTot), - the p.values (PVal.less and PVal.greater) to evaluate the significance of the difference between the former two indices. - the standardized effect size for the whole community (SES.Tot). A SES that is greater than 2 or less than -2 is statistically significant with a tail probability of less than 0.05 (Gotelli & McCabe 2002 - Ecology). If a community is structured by competition, we would expect the C-score to be large relative to a randomly assembled community (positive SES). In this case the observed C-score is significantly lower than expected by chance, this meaning that the community is dominate by positive interactions (aggregated pattern).

A table is saved in the path specified where the same metrics are calculated for each species pair (only the table with species pairs with significant p.values is saved).