Examples for the **corrgram** package

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1 Abstract

The corrgram package is an implementation of correlograms. This vignette reproduces most of the figures in Michael Friendly's paper. Friendly, Michael. 2002. Corrgrams: Exploratory Displays for Correlation Matrices. *The American Statistician*, 56, 316–324.

2 Setup

Load the package.

```
library("corrgram")
```

Figure 2

```
vars2 <- c("Assists","Atbat","Errors","Hits","Homer","logSal",
           "Putouts","RBI","Runs","Walks","Years")
corrgram(baseball[,vars2], order=TRUE,
         main="Baseball data PC2/PC1 order",
         lower.panel=panel.shade, upper.panel=panel.pie,
         diag.panel=panel.minmax, text.panel=panel.txt)
```

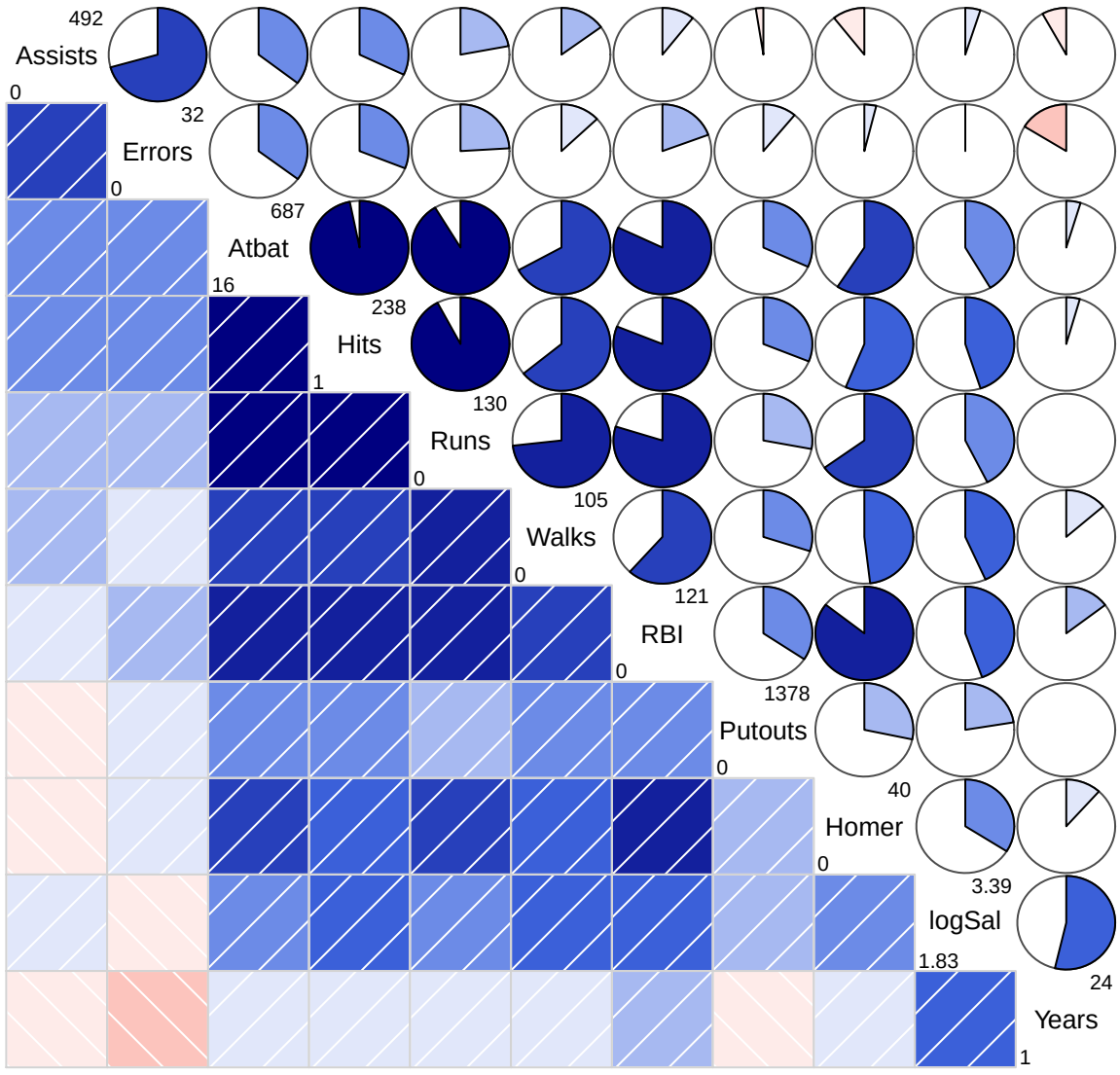


Figure 3

```
baseball.cor <- cor(baseball[,vars2], use=pair)
baseball.eig <- eigen(baseball.cor)$vectors[,1:2]
e1 <- baseball.eig[,1]
e2 <- baseball.eig[,2]
plot(e1,e2,col=white, xlim=range(e1,e2), ylim=range(e1,e2))
text(e1,e2, rownames(baseball.cor), cex=1)
arrows(0, 0, e1, e2, cex=0.5, col="red", length=0.1)
```

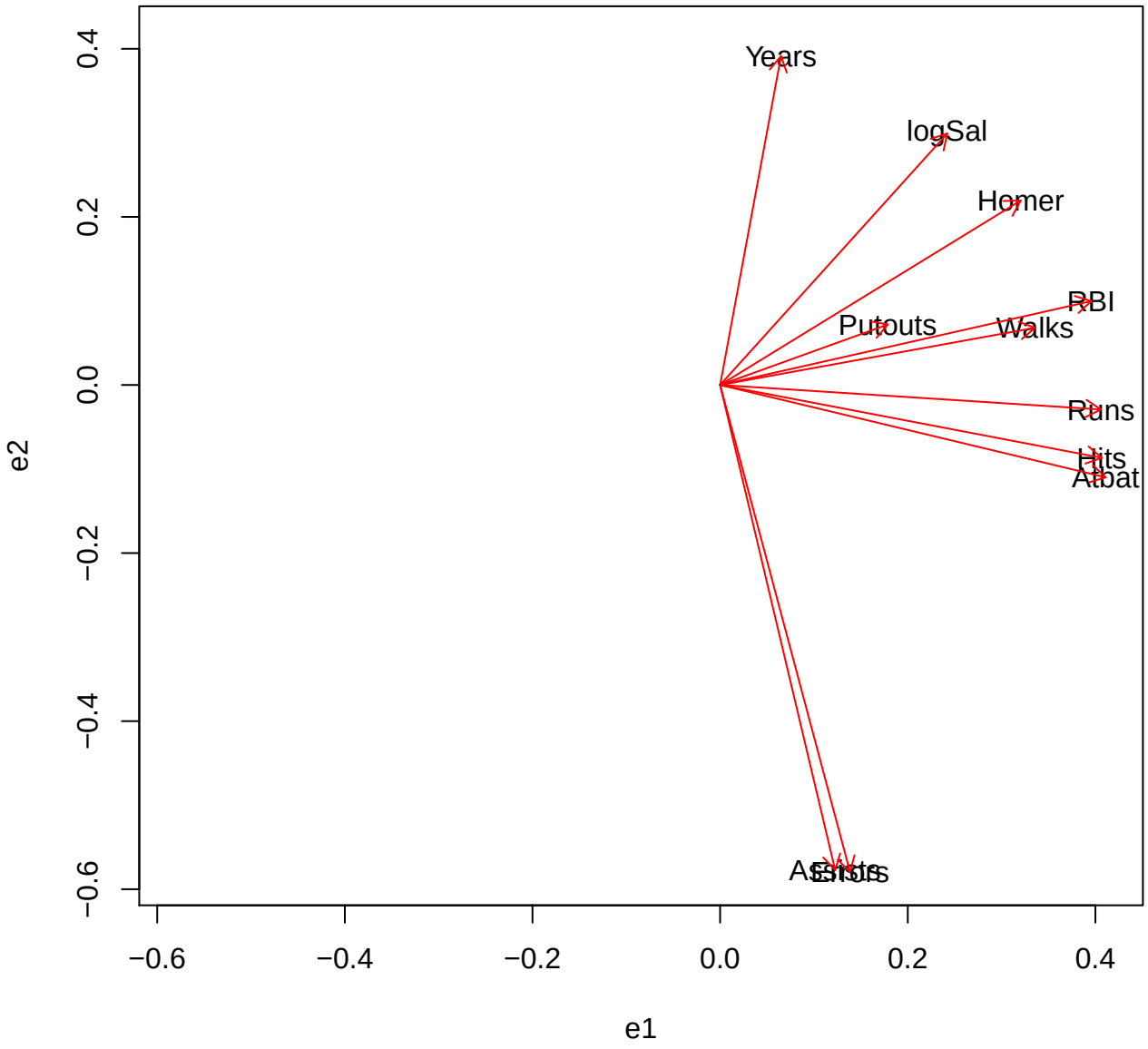
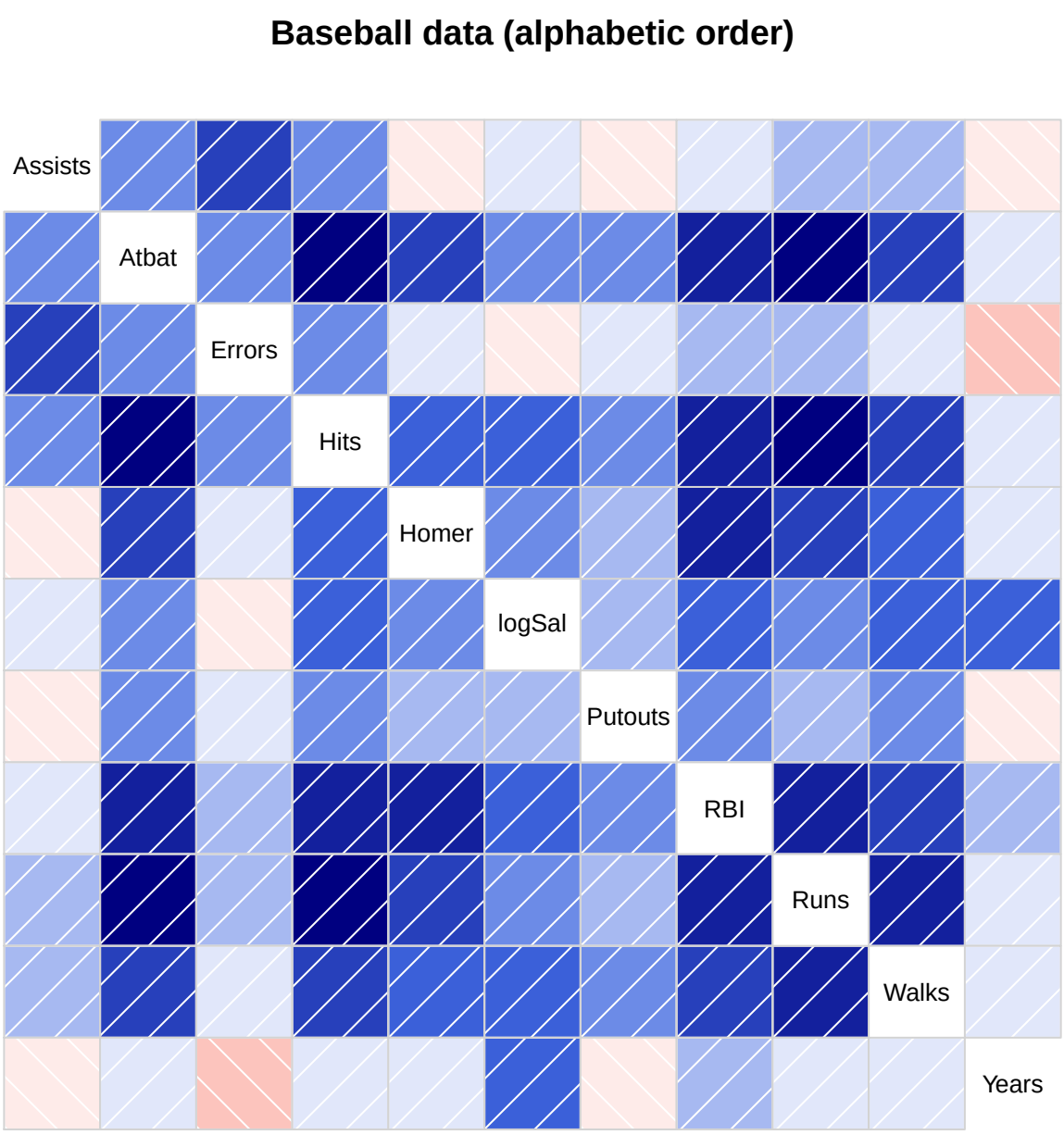


Figure 4a, 4b

```
corrgram(baseball[,vars2], main="Baseball data (alphabetic order)")
```




```
corrgram(baseball[,vars2], order=TRUE,
         main="Baseball data (PC order)",
         panel=panel.shade, text.panel=panel.txt)
```

Baseball data (PC order)

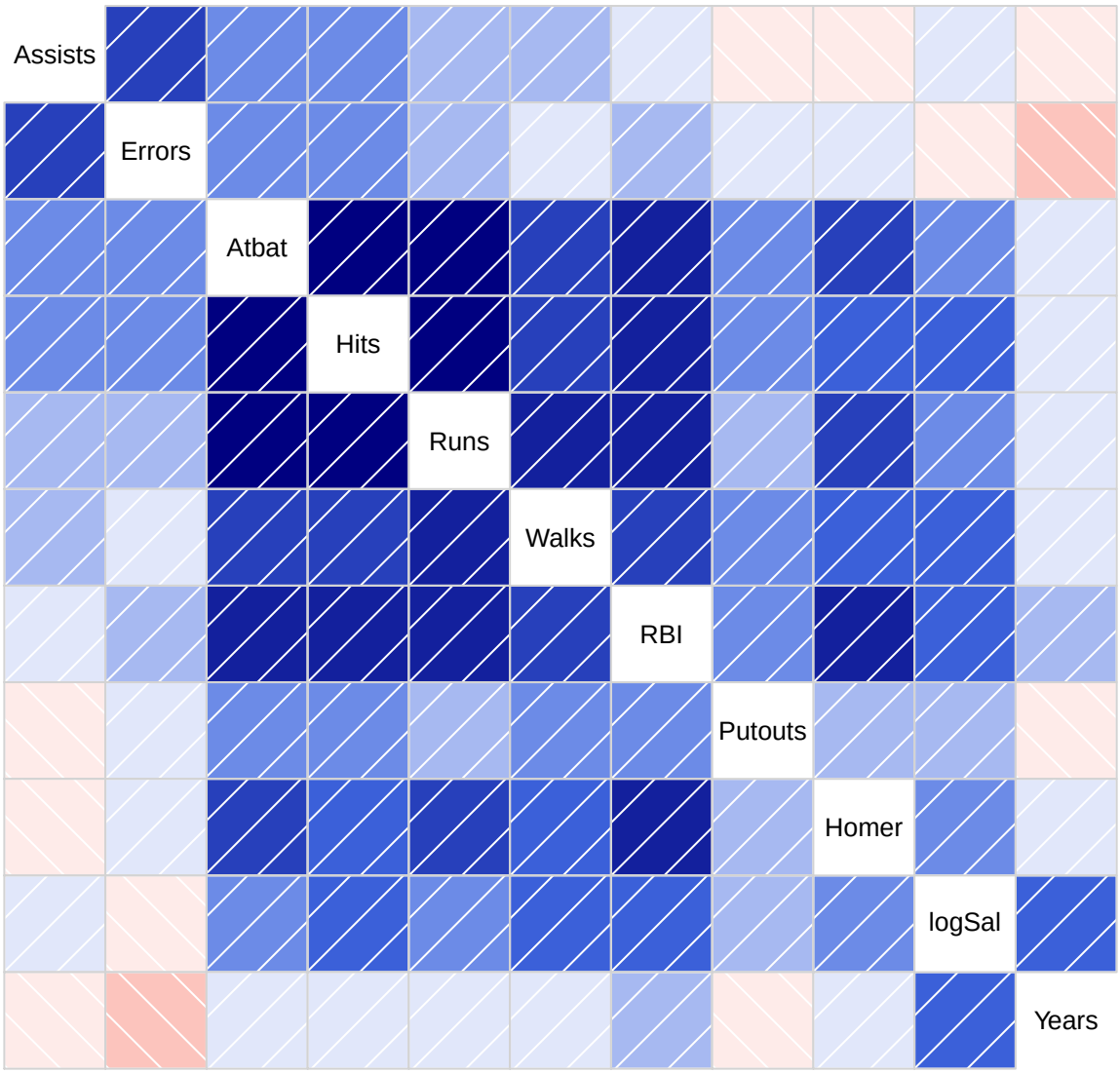


Figure 5

```
corrgram(baseball, order=TRUE, main="Baseball data (PC order)")
```

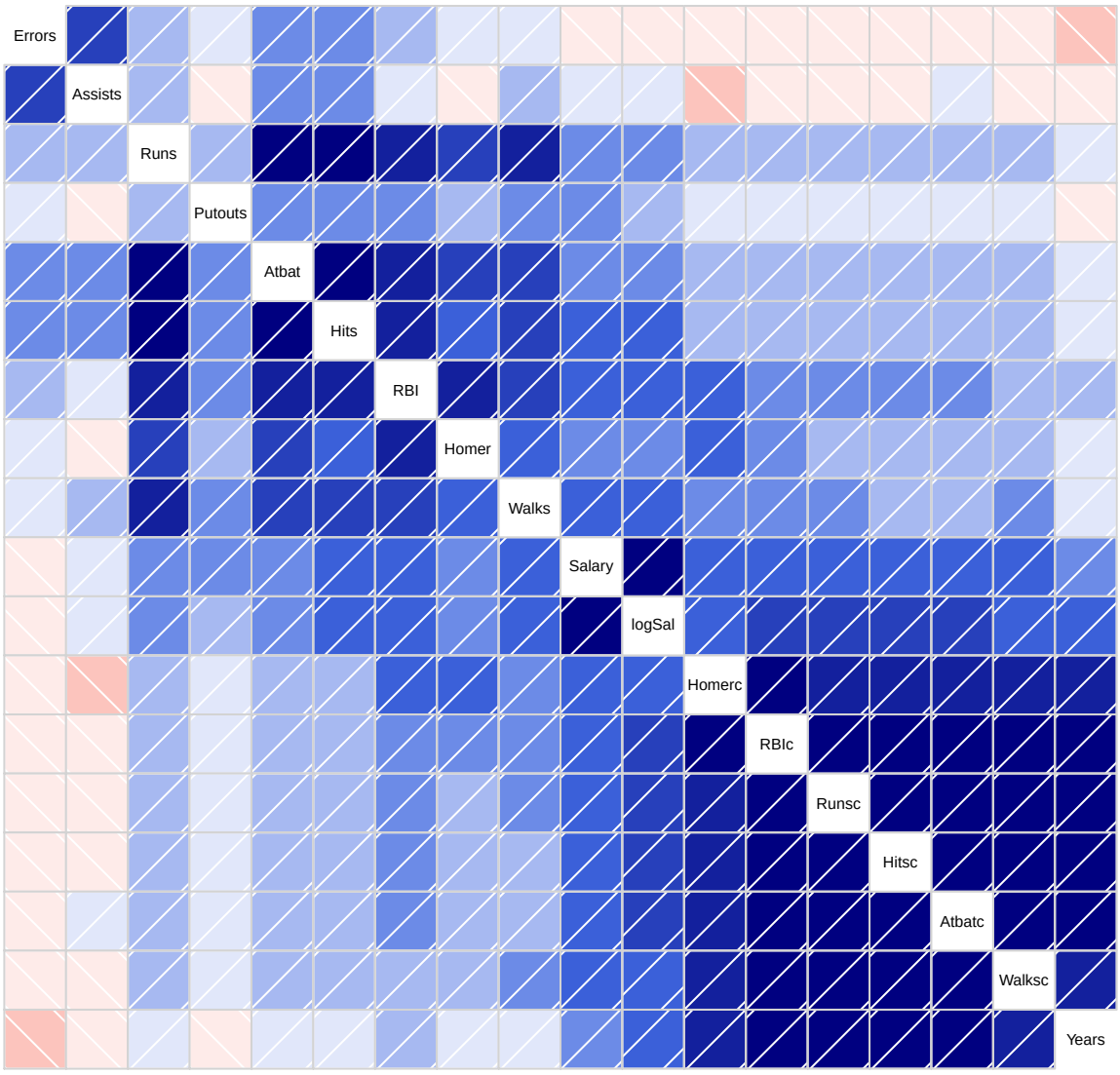


Figure 6. Arrangement is slightly different from Friendly.

```
corrgram(auto, order=TRUE, main="Auto data (PC order)")
```

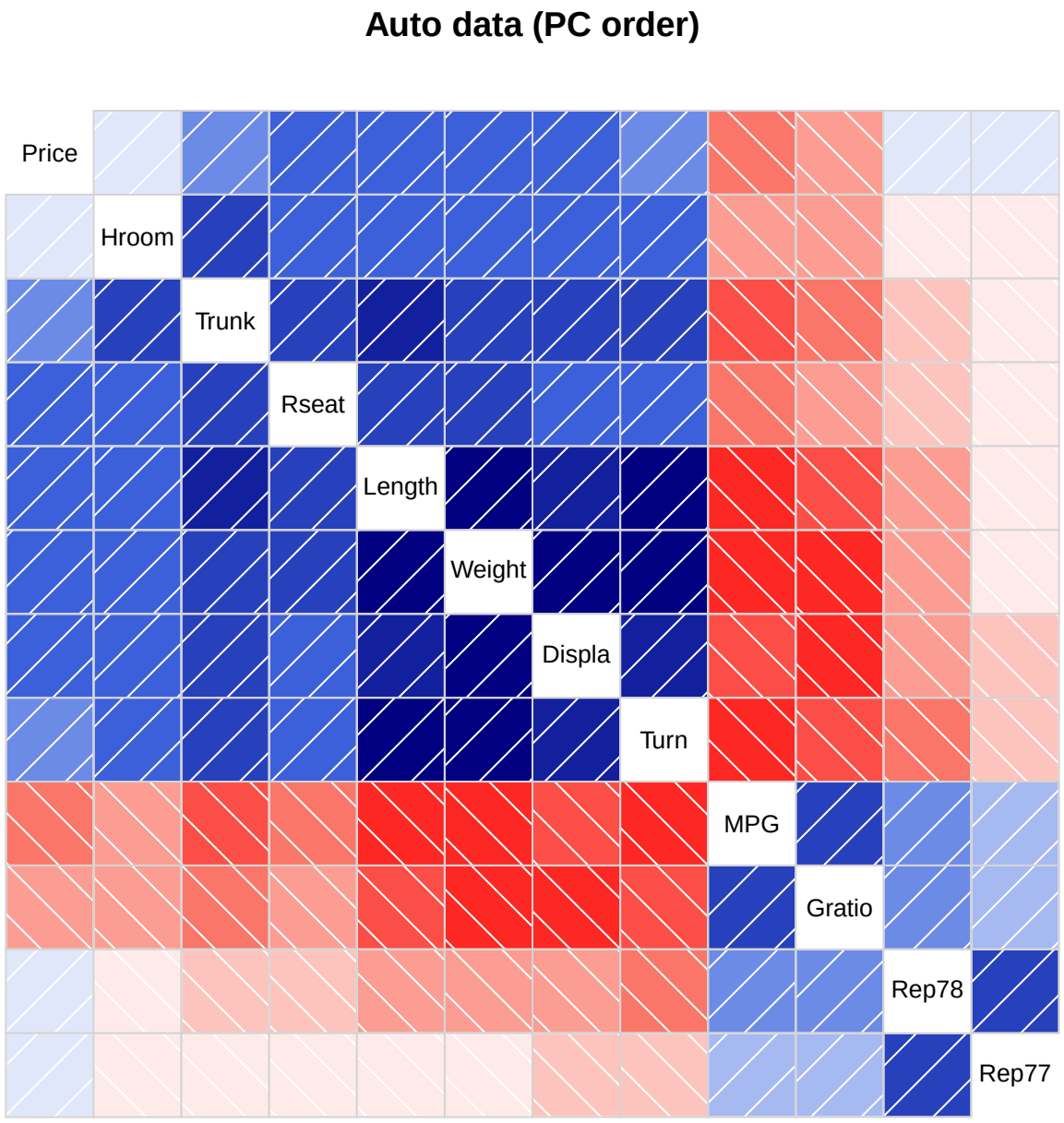


Figure 7.

```
rinv <- function(r){
  # r is a correlation matrix
  # calculate r inverse and scale to correlation matrix
  # Derived from Michael Friendlys SAS code

  ri <- solve(r)
  s <- diag(ri)
  s <- diag(sqrt(1/s))
  ri <- s %*% ri %*% s
  n <- nrow(ri)
  ri <- ri * (2*rep(1,n) - matrix(1, n, n))
  diag(ri) <- 1  # Should already be 1, but could be 1 + epsilon
  colnames(ri) <- rownames(ri) <- rownames(r)
  return(ri)
}

vars7 <- c("Years", "logSal", "Homer", "Putouts", "RBI", "Walks",
           "Runs", "Hits", "Atbat", "Errors", "Assists")
cb <- cor(baseball[,vars7], use="pair")
corrgram(-rinv(cb), main=expression(paste("Baseball data ", R^-1)))
```

Baseball data R^{-1}

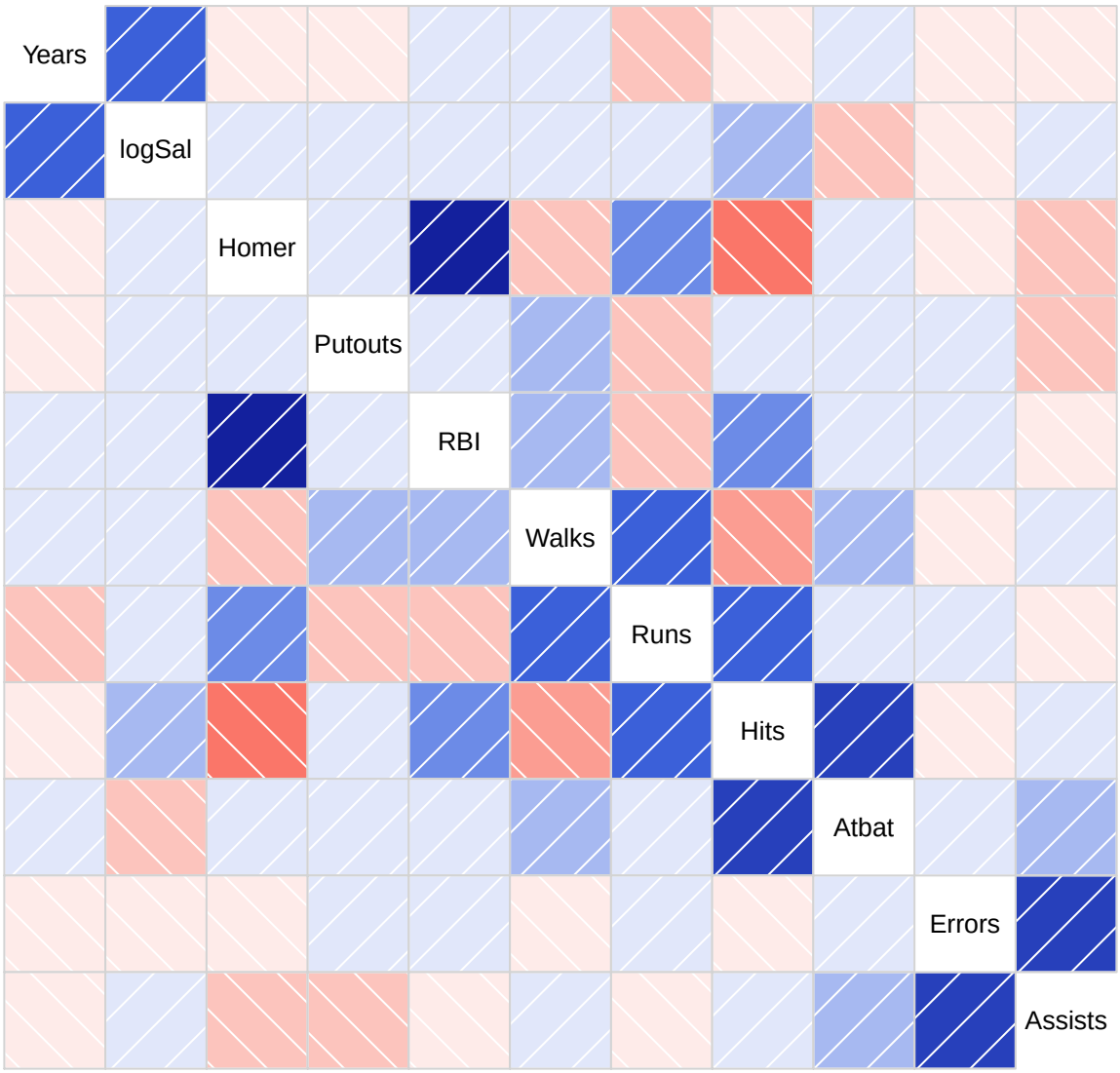


Figure 8

```
require(Matrix) # For block diagonal function
```

```
## Loading required package:  Matrix
##
## Attaching package:  'Matrix'
##
## The following objects are masked from 'package:base':
##
##    crossprod, tcrossprod
```

```
partial <- function(r, xvar){
  # r is a correlation matrix
  # Calculate partial correlation of y|x
  yvar <- setdiff(colnames(r), xvar)
  ri <- r[yvar,yvar] - r[yvar,xvar] %*% solve(r[xvar,xvar]) %*% r[xvar,yvar]
  s <- diag(ri)
  s <- diag(sqrt(1/s))
  ri <- s %*% ri %*% s
  ri <- as.matrix(bdiag(ri, r[xvar, xvar]))
  diag(ri) <- 1  # Should already be 1, but could be 1 + epsilon
  colnames(ri) <- rownames(ri) <- c(yvar, xvar)
  return(ri)
}

vars8a <- c("Gratio", "Rep78", "Rep77", "Hroom", "Trunk", "Rseat",
            "Length", "Weight", "Displa", "Turn")
vars8b <- c("MPG", "Price")
vars8 <- c(vars8a, vars8b)
auto.cor <- cor(auto[, vars8], use="pair")
auto.par <- partial(auto.cor, vars8b)
corrgram(auto.par, lower.panel=panel.pie, upper.panel=panel.pie,
         main="Auto data, partialing out Price,MPG")
```

Auto data, partialing out Price,MPG

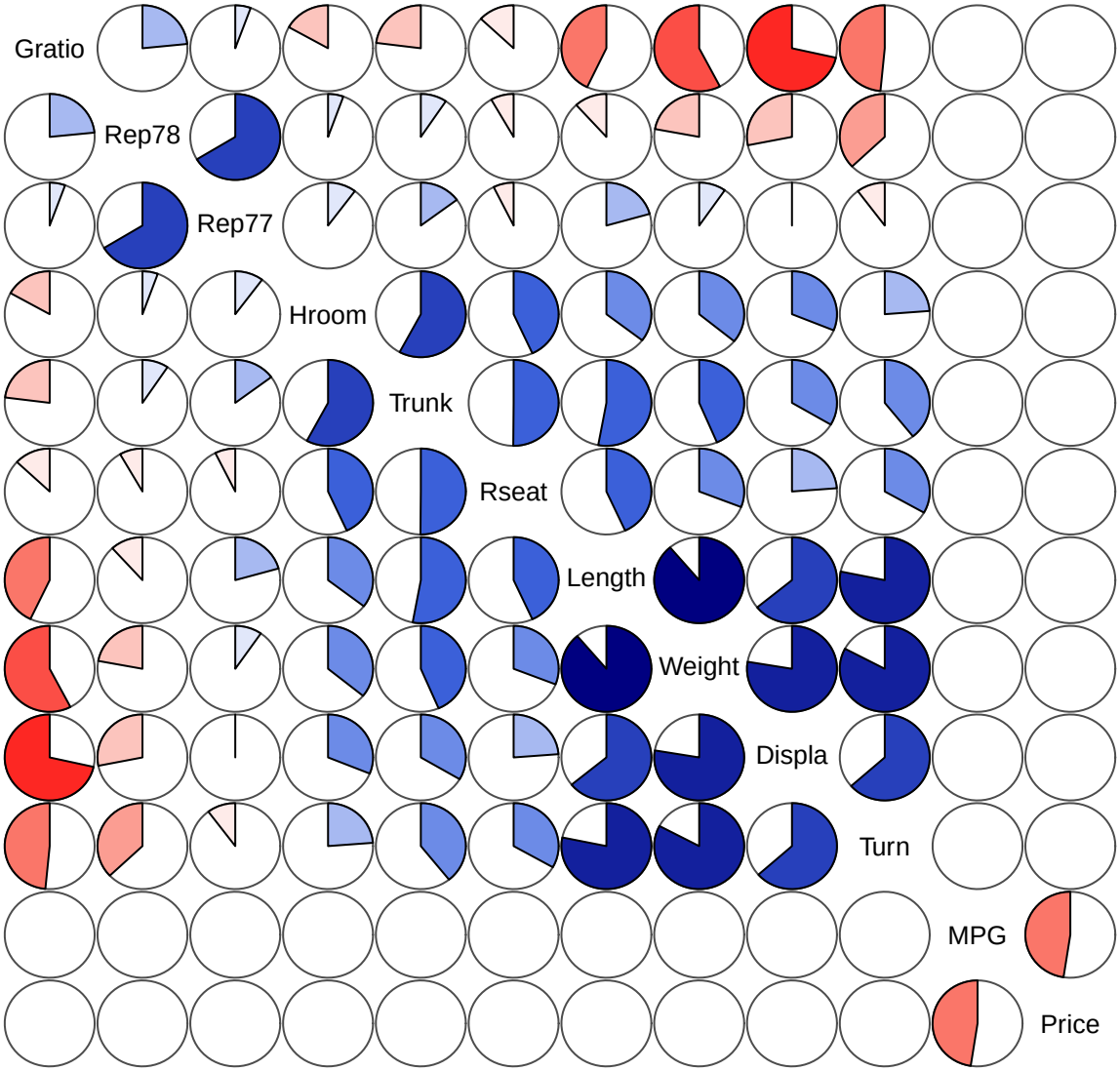
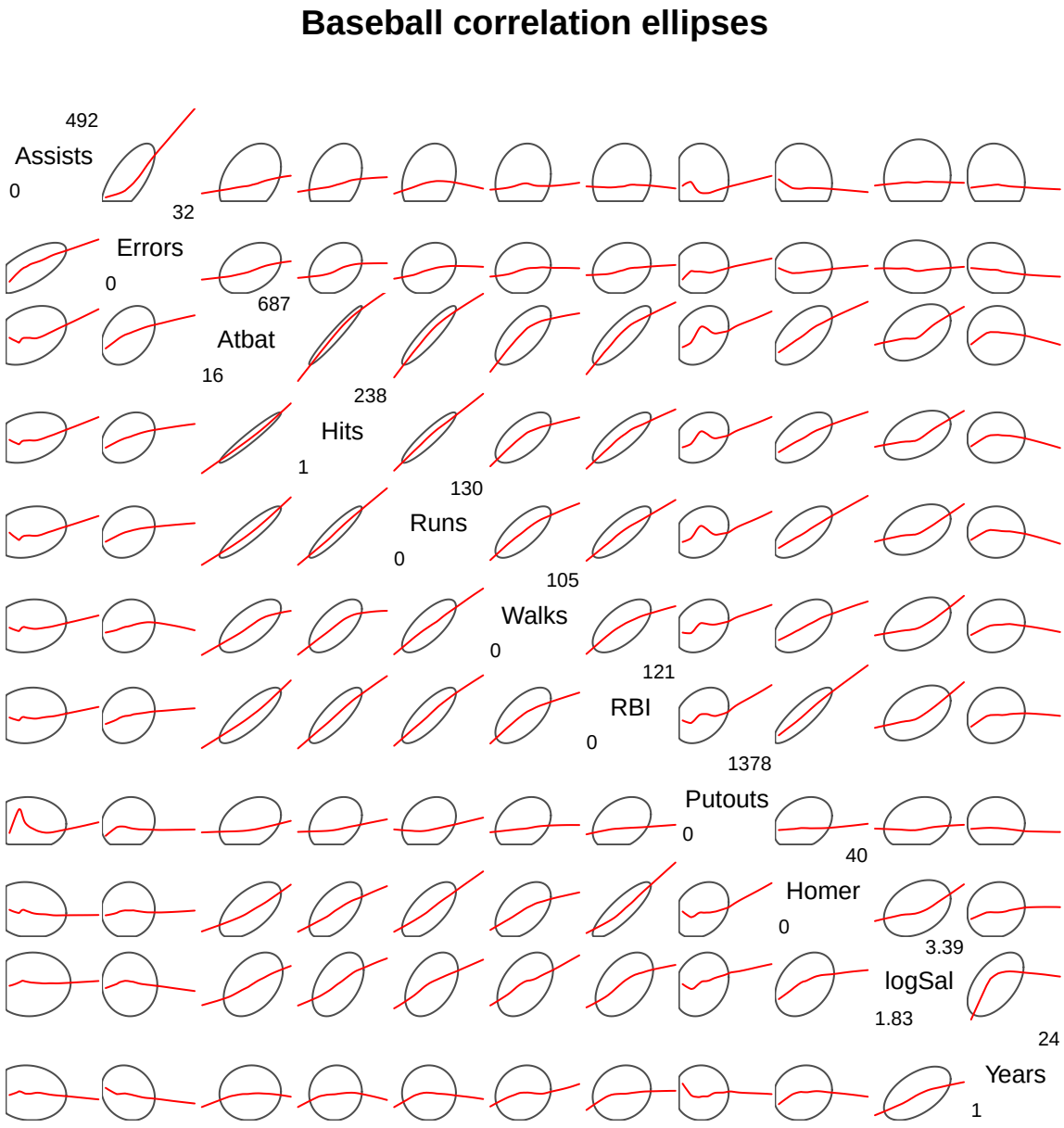


Figure 11

```
corrgram(baseball[,vars2], order=TRUE,
         main="Baseball correlation ellipses",
         panel=panel.ellipse,
         text.panel=panel.txt, diag.panel=panel.minmax)
```



3 Appendix

Session information:

- R version 3.1.3 (2015-03-09), `x86_64-w64-mingw32`
- Base packages: base, datasets, grDevices, graphics, methods, stats, utils
- Other packages: Matrix 1.2-1, corrgram 1.8, knitr 1.10.5
- Loaded via a namespace (and not attached): KernSmooth 2.23-14, MASS 7.3-41, TSP 1.1-1, bitops 1.0-6, caTools 1.17.1, cluster 2.0.2, codetools 0.2-11, colorspace 1.2-6, evaluate 0.7, foreach 1.4.2, formatR 1.2, gclus 1.3.1, gdata 2.16.1, gplots 2.17.0, grid 3.1.3, gtools 3.4.2, highr 0.5, iterators 1.0.7, lattice 0.20-31, magrittr 1.5, registry 0.2, seriation 1.1-0, stringi 0.5-2, stringr 1.0.0, tools 3.1.3