

Package ‘Blendstat’

March 6, 2018

Type Package

Title Joint Analysis of Experiments with Mixtures and Random Effects

Version 1.0.1

Date 2018-03-06

Author Marcelo Angelo Cirillo <macufla@gmail.com>
Paulo Cesar Ossani <ossanipc@hotmail.com>

Maintainer Paulo Cesar Ossani <ossanipc@hotmail.com>

Depends MASS, lattice

Description Package to perform a joint analysis of experiments with mixtures and random effects, assuming a process variable, represented by a covariate, Kalirajan K P (1990) <doi:10.1080/757582835>.

License GPL (>= 2)

NeedsCompilation no

Repository CRAN

Date/Publication 2018-03-06 17:15:11 UTC

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Blend

Joint analysis of experiments with mixtures and random effects.

Description

Joint analysis of experiments with mixtures and random effects, assuming a process variable, represented by a covariate.

Usage

```
Blend(Exp, X, Y, Conc = NULL, Effects = NULL)
```

Arguments

Exp	Vector with the names of the experiments.
X	Regressor variables, not including the covariate.
Y	Dependent variable
Conc	Vector with concentrations (covariate) of the experiments.
Effects	Vector of the effects of the blends in a reference mixture (example: centroid).

Value

MPred	Matrix with predicted and observed values.
MCPred	Matrix with the values predicted by the components.
MExp	Design of the experiments
Theta	Vector with Theta estimates.

Author(s)

Marcelo Angelo Cirillo
Paulo Cesar Ossani

References

Kalirajan, K. P. On the estimation of a regression model with fixed and random coefficients. *Journal of Applied Statistics*, 17: 237-244, 1990. doi:10.1080/757582835

See Also

[Plot.Blend](#)

Examples

```
data(DataCD) # dataset
#data(DataNAT) # dataset

Dados <- DataCD

Exp <- Dados[,2] # identification of experiments

X <- Dados[,3:6] # independent variable
Y <- Dados[,11] # dependent variable

# effects of the blends in a reference mixture
Effects <- rep(c(-0.1,0,0.1,0.2,0.3,0.4,0.5,0.6,0.7),4)

Conc <- as.matrix(Dados[,7]) # covariate (process variable)

Res <- Blend(Exp = Exp, X = X, Y = Y, Conc = Conc, Effects = Effects)

print("Predicted values:"); Res$MPred
print("Values predicted by the components:"); Res$MCPred
print("Design matrix:"); Res$MExp
print("Estimates of linear model parameters:"); Res$Theta

Tit <- c("Covariate (process variable)", "Variable")

Xlab = "Effects" # label axis X
Ylab = "Predicted values" # label axis Y

Plot.Blend(Res, Titles = Tit, PosLeg = 2, xlabel = Xlab,
           ylabel = Ylab, BoxLeg = TRUE, Color = TRUE)
```

Blendstat

Package for joint analysis of experiments with mixtures and random effects.

Description

Package to perform a joint analysis of experiments with mixtures and random effects, assuming a process variable, represented by a covariate.

Details

Package:	Blendstat
Type:	Package
Version:	1.0.1
Date:	2018-03-06
License:	GPL(>= 2)
LazyLoad:	yes

Author(s)

Marcelo Angelo Cirillo e Paulo Cesar Ossani.

Maintainer: Paulo Cesar Ossani <ossanipc@hotmail.com>

References

Kalirajan, K. P. On the estimation of a regression model with fixed and random coefficients. *Journal of Applied Statistics*, 17: 237-244, 1990. doi:10.1080/757582835

DataCD	<i>Dataset, peeled cherry coffee.</i>
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Description

Database of coffee blends of different varieties processed via wet (peeled cherry).

Usage

```
data(DataCD)
```

Format

Database formed by variables: Exp (identification of experiments); CEB (specialty Arabica Genotype Yellow Bourbon); CT (Commercial coffee); CC (Canephora coffee); CEA (specialty Arabica Genotype Acaia); Conc (Concentration: 7% m/v and 10% in 35 g/500 ml) concentrations were used in the experiments wet Process Coffee. Dependent variables defined by sensory attributes: Body, Flavour, Acidity, Bitterness, Score.

References

CNPq for their aid via grant number 304974/2015-3.

Examples

```
data(DataCD) # dataset

Dados <- DataCD

Exp <- Dados[,2] # identification of experiments

X <- Dados[,3:6] # independent variable
Y <- Dados[,11] # dependent variable

# effects of the blends in a reference mixture
Effects <- rep(c(-0.1,0,0.1,0.2,0.3,0.4,0.5,0.6,0.7),4)
```

```

Conc <- as.matrix(Dados[,7]) # covariate (process variable)

Res <- Blend(Exp = Exp, X = X, Y = Y, Conc = Conc, Effects = Effects)

print("Predicted values:"); Res$MPred
print("Values predicted by the components:"); Res$MCPred
print("Design matrix:"); Res$MExp
print("Estimates of linear model parameters:"); Res$Theta

```

DataNAT

Dataset, natural cherry coffee.

Description

Database of coffee blends of different varieties dry processed.

Usage

```
data(DataNAT)
```

Format

Database formed by variables: Exp (identification of experiments); CEB (specialty Arabica Genotype Yellow Bourbon); CT (Commercial coffee); CC (Canephora coffee); CEA (specialty Arabica Genotype Acaia); Conc (Concentration: 7% m/v and 10% in 35 g/500 ml) concentrations were used in the experiments dry Process Coffee. Dependent variables defined by sensory attributes: Body, Flavour, Acidity, Bitterness, Score.

References

CNPq for their aid via grant number 304974/2015-3.

Examples

```

data(DataNAT) # dataset

Dados <- DataNAT

Exp <- Dados[,2] # identification of experiments

X <- Dados[,3:6] # independent variable
Y <- Dados[,11] # dependent variable

# effects of the blends in a reference mixture
Effects <- rep(c(-0.1,0,0.1,0.2,0.3,0.4,0.5,0.6,0.7),4)

Conc <- as.matrix(Dados[,7]) # covariate (process variable)

```

```

Res <- Blend(Exp = Exp, X = X, Y = Y, Conc = Conc, Effects = Effects)

print("Predicted values:"); Res$MPred
print("Values predicted by the components:"); Res$MCPred
print("Design matrix:"); Res$MExp
print("Estimates of linear model parameters:"); Res$Theta

```

Plot.Blend

Optimization graphs.

Description

Trace plot of the experiments as a function of the components.

Usage

```

Plot.Blend(BL, Titles = c(NA,NA), PosLeg = 2, xlabel = NA,
           ylabel = NA, BoxLeg = FALSE, Color = TRUE)

```

Arguments

BL	Function data Blend.
Titles	Titles for the graph of the effects of concentrations and components. If not set, assume the default text.
PosLeg	1 - caption left, 2 - caption right (default), 3 - caption above, 4 - caption below.
xlabel	Label axis X. If not set, assume the default text.
ylabel	Label axis Y. If not set, assume the default text.
BoxLeg	Place frame in legend (default = FALSE).
Color	Colorful graphics (default = TRUE)

Value

Return several graphics.

Author(s)

Marcelo Angelo Cirillo
Paulo Cesar Ossani

See Also

[Blend](#)

Examples

```
data(DataCD) # dataset
#data(DataNAT) # dataset

Dados <- DataCD

Exp <- Dados[,2] # identification of experiments

X <- Dados[,3:6] # independent variable
Y <- Dados[,11] # dependent variable

# effects of the blends in a reference mixture
Effects <- rep(c(-0.1,0,0.1,0.2,0.3,0.4,0.5,0.6,0.7),4)

Conc <- as.matrix(Dados[,7]) # covariate (process variable)

Res <- Blend(Exp = Exp, X = X, Y = Y, Conc = Conc, Effects = Effects)

print("Predicted values:"); Res$MPred
print("Values predicted by the components:"); Res$MCPred
print("Design matrix:"); Res$MExp
print("Estimates of linear model parameters:"); Res$Theta

Tit <- c("Covariate (process variable)", "Variable")

Xlab = "Effects" # label axis X
Ylab = "Predicted values" # label axis Y

Plot.Blend(Res, Titles = Tit, PosLeg = 2, xlabel = Xlab,
           ylabel = Ylab, BoxLeg = TRUE, Color = TRUE)
```

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