Package 'eefAnalytics'

March 16, 2021

Version 1.0.11

Title Robust Analytical Methods for Evaluating Educational Interventions using Randomised Controlled Trials Designs

Description Analysing data from evaluations of educational interventions using a randomised controlled trial design. Various analytical tools to perform sensitivity analysis using different methods are supported (e.g. frequentist models with bootstrapping and permutations options, Bayesian models). The included commands can be used for simple randomised trials, cluster randomised trials and multisite trials. The methods can also be used more widely beyond education trials. This package can be used to evaluate other intervention designs using Frequentist and Bayesian multilevel models.

Author Germaine Uwimpuhwe, Akansha Singh, Steve Higgins, ZhiMin Xiao, Ewoud De Troyer and Adetayo Kasim

Maintainer Germaine Uwimpuhwe <germaine.uwimpuhwe@durham.ac.uk>

Imports lme4, mvtnorm, graphics, stats, rstanarm, ggplot2, methods

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.1

Suggests knitr, rmarkdown, testthat

VignetteBuilder knitr

URL https://github.com/germaine86/eefAnalytics

BugReports https://github.com/germaine86/eefAnalytics/issues

NeedsCompilation no

Repository CRAN

Date/Publication 2021-03-16 11:50:05 UTC

R topics documented:

`ComparePlot` *A plot function to compare different eefAnalytics S3 objects from the eefAnalytics package.*

Description

It generates bar plot that compares the effect size from eefAnalytics' methods.

Usage

```
ComparePlot(
  eefAnalyticsList,
  group,
  Conditional = TRUE,
  ES_Total = TRUE,
  modelNames
)
```

Arguments

`eefAnalyticsList`	A list of eefAnalytics S3 objects from eefAnalytics package.
`group`	a string/scalar value indicating which intervention to plot. This must be one of the values of intervention variable excluding the control group. For a two arm trial, the maximum number of values to consider is 1 and 2 for three arm trial.
`Conditional`	a logical value to indicate whether to plot conditional effect size. The default is Conditional=TRUE, otherwise Conditional=FALSE should be specified for plot based on unconditional effect size. Conditional variance is total or residual variance a multilevel model with fixed effects, whilst unconditional variance is total variance or residual variance from a multilevel model with only intercept as fixed effect.
`ES_Total`	A logical value indicating whether to plot the effect size based on total variance or within school variance. The default is ES_Total=TRUE, to plot effect size using total variance. ES_Total=FALSE should be specified for effect size based on within school or residuals variance.

modelNames a string factor containing the names of model to compare. See examples below.

Details

ComparePlot produces a bar plot which compares the effect sizes and the associated confidence intervals from the different models. For a multilevel model, it shows the effect size based on residual variance and total variance.

Value

Returns a bar plot to compare the different methods. The returned figure can be further modified as any ggplot

Examples

```
if(interactive()){

data(mstData)
###############
##### SRT #####
###############

outputSRT <- srtFREQ(Posttest~ Intervention + Prettest,
                     intervention = "Intervention", data = mstData)

outputSRTBoot <- srtFREQ(Posttest~ Intervention + Prettest,
                         intervention = "Intervention",nBoot=1000, data = mstData)

###############
##### MST #####
###############

outputMST <- mstFREQ(Posttest~ Intervention + Prettest,
                     random = "School", intervention = "Intervention", data = mstData)

outputMSTBoot <- mstFREQ(Posttest~ Intervention + Prettest,
                         random = "School", intervention = "Intervention",
                         nBoot = 1000, data = mstData)

##################
##### Bayesian #####
##################

outputSRTbayes <- srtBayes(Posttest~ Intervention + Prettest,
                           intervention = "Intervention",
                           nsim = 2000, data = mstData)

## comparing different results

ComparePlot(list(outputSRT,outputSRTBoot,outputMST,outputMSTBoot,outputSRTbayes),
            modelNames =c("ols", "olsBoot","MLM","MLMBoot","OLSBayes"),group=1)
```

```
}
```

`crtBayes` *Bayesian analysis of cluster randomised education trials using Vague Priors.*

Description

`crtBayes` performs analysis of cluster randomised education trials using a multilevel model under a Bayesian setting, assuming vague priors.

Usage

```
crtBayes(
  formula,
  random,
  intervention,
  baseln,
  adaptD,
  nsim = 2000,
  data,
  threshold = 1:10/10,
  ...
)
```

Arguments

`formula`	the model to be analysed is of the form y ~ x1+x2+.... Where y is the outcome variable and Xs are the independent variables.
`random`	a string variable specifying the "clustering variable" as contained in the data. See example below.
`intervention`	a string variable specifying the "intervention variable" as appearing in the formula and the data. See example below.
`baseln`	A string variable allowing the user to specify the reference category for intervention variable. When not specified, the first level will be used as a reference.
`adaptD`	As this function uses rstanarm, this term provides the target average proposal acceptance probability during Stan's adaptation period. Default is NULL.
`nsim`	number of MCMC iterations per chain. Default is 2000.
`data`	data frame containing the data to be analysed.
`threshold`	a scalar or vector of pre-specified threshold(s) for estimating Bayesian posterior probability such that the observed effect size is greater than or equal to the threshold(s).
`...`	additional arguments of `stan_lmer` to be passed to the function.

Value

S3 object; a list consisting of

- `Beta`: Estimates and credible intervals for variables specified in the model. Use `summary.eefAnalytics` to get Rhat and effective sample size for each estimate.
- `ES`: Conditional Hedges' g effect size and its 95
- `covParm`: A vector of variance decomposition into between cluster variance (Schools) and within cluster variance (Pupils). It also contains intra-cluster correlation (ICC).
- `SchEffects`: A vector of the estimated deviation of each school from the intercept.
- `ProbES`: A matrix of Bayesian Posterior Probabilities such that the observed effect size is greater than or equal to a pre-specified threshold(s).
- `Model`: A stan_glm object used in ES computation, this object can be used for convergence diagnostic.
- `Unconditional`: A list of unconditional effect sizes, covParm and ProbES obtained based on between and within cluster variances from the unconditional model (model with only the intercept as a fixed effect).

Examples

```
if(interactive()){

  data(crtData)

  ##########################################################
  ## Bayesian analysis of cluster randomised trials     ##
  ##########################################################

  output <- crtBayes(Posttest~ Intervention+Prettest,random="School",
                     intervention="Intervention",nsim=2000,data=crtData)

  ### Fixed effects
  beta <- output$Beta
  beta

  ### Effect size
  ES1 <- output$ES
  ES1

  ## Covariance matrix
  covParm <- output$covParm
  covParm

  ### plot random effects for schools

  plot(output)

 ### plot posterior probability of an effect size to be bigger than a pre-specified threshold

  plot(output,group=1)
}
```

crtData — *Cluster Randomised Trial Data.*

Description

A cluster randomised trial dataset containing 22 schools. The data contains a random sample of test data of pupils and not actual trial data.

Format

A data frame with 265 rows and 5 variables

Details

- Posttest: posttest scores
- Prettest: prettest scores
- Intervention: the indicator for intervention groups in a two arm trial, coded as 1 for intervention group and 0 for control group.
- Intervention2: a simulated indicator for intervention groups in a three arm trial.
- School: numeric school identifier

crtFREQ — *Analysis of Cluster Randomised Education Trials using Multilevel Model under a Frequentist Setting.*

Description

`crtFREQ` performs analysis of cluster randomised education trials using a multilevel model under a frequentist setting.

Usage

```
crtFREQ(formula, random, intervention, baseln, nPerm, nBoot, seed, data)
```

Arguments

`formula`	the model to be analysed is of the form y ~ x1+x2+.... Where y is the outcome variable and Xs are the independent variables.
`random`	a string variable specifying the "clustering variable" as contained in the data. See example below.
`intervention`	a string variable specifying the "intervention variable" as appearing in the formula and the data. See example below.
`baseln`	A string variable allowing the user to specify the reference category for intervention variable. When not specified, the first level will be used as a reference.

nPerm	number of permutations required to generate a permutated p-value.
nBoot	number of bootstraps required to generate bootstrap confidence intervals.
seed	seed required for bootstrapping and permutation procedure, if not provided default seed will be used.
data	data frame containing the data to be analysed.

Value

S3 object; a list consisting of

- Beta: Estimates and confidence intervals for variables specified in the model.
- ES: Conditional Hedges' g effect size and its 95
- covParm: A vector of variance decomposition into between cluster variance (Schools) and within cluster variance (Pupils). It also contains intra-cluster correlation (ICC).
- SchEffects: A vector of the estimated deviation of each school from the intercept.
- Perm: A "nPerm x 2w" matrix containing permutated effect sizes using residual variance and total variance. "w" denotes number of intervention. "w=1" for two arm trial and "w=2" for three arm trial excluding the control group. It is produced only when nPerm is specified.
- Bootstrap: A "nBoot x 2w" matrix containing the bootstrapped effect sizes using residual variance (Within) and total variance (Total). "w" denotes number of intervention. "w=1" for two arm trial and "w=2" for three arm trial excluding the control group. It is only produced when nBoot is specified.
- Unconditional: A list of unconditional effect sizes, covParm, Perm and Bootstrap obtained based on variances from the unconditional model (model with only the intercept as a fixed effect).

Examples

```
if(interactive()){

data(crtData)

#########################################################
## MLM analysis of cluster randomised trials + 1.96SE ##
#########################################################

output1 <- crtFREQ(Posttest~ Intervention+Prettest,random="School",
intervention="Intervention",data=crtData)


### Fixed effects
beta <- output1$Beta
beta

### Effect size
ES1 <- output1$ES
ES1
```

```
## Covariance matrix
covParm <- output1$covParm
covParm

### plot random effects for schools

plot(output1)

##############################################
## MLM analysis of cluster randomised trials ##
## with bootstrap confidence intervals       ##
##############################################

output2 <- crtFREQ(Posttest~ Intervention+Prettest,random="School",
intervention="Intervention",nBoot=1000,data=crtData)


### Effect size

ES2 <- output2$ES
ES2

### plot bootstrapped values

plot(output2, group=1)

#########################################################################
## MLM analysis of cluster randomised trials with permutation p-value##
#########################################################################

output3 <- crtFREQ(Posttest~ Intervention+Prettest,random="School",
intervention="Intervention",nPerm=1000,data=crtData)

### Effect size

ES3 <- output3$ES
ES3


### plot permutated values

plot(output3, group=1)
}
```

---

mstBayes *Bayesian analysis of Multisite Randomised Education Trials using Vague Priors.*

Description

mstBayes performs analysis of multisite randomised education trials using a multilevel model under a Bayesian setting assuming vague priors.

Usage

```
mstBayes(
  formula,
  random,
  intervention,
  baseln,
  adaptD,
  nsim = 2000,
  data,
  threshold = 1:10/10,
  ...
)
```

Arguments

formula	the model to be analysed is of the form y ~ x1+x2+.... Where y is the outcome variable and Xs are the independent variables.
random	a string variable specifying the "clustering variable" as contained in the data. See example below.
intervention	a string variable specifying the "intervention variable" as appearing in the formula and the data. See example below.
baseln	A string variable allowing the user to specify the reference category for intervention variable. When not specified, the first level will be used as a reference.
adaptD	As this function uses rstanarm, this term provides the target average proposal acceptance probability during Stan's adaptation period. Default is NULL.
nsim	number of MCMC iterations per chain. Default is 2000.
data	data frame containing the data to be analysed.
threshold	a scalar or vector of pre-specified threshold(s) for estimating Bayesian posterior probability that the observed effect size is greater than or equal to the threshold(s).
...	additional arguments of stan_lmer to be passed to the function.

Value

S3 object; a list consisting of

- Beta: Estimates and credible intervals for variables specified in the model. Use summary.eefAnalytics to get Rhat and effective sample size for each estimate.
- ES: Conditional Hedges' g effect size and its 95
- covParm: A list of variance decomposition into between cluster variance-covariance matrix (schools and school by intervention) and within cluster variance (Pupils). It also contains intra-cluster correlation (ICC).

- SchEffects: A vector of the estimated deviation of each school from the intercept and intervention slope.
- ProbES: A matrix of Bayesian posterior probabilities such that the observed effect size is greater than or equal to a pre-specified threshold(s).
- Model: A stan_glm object used in ES computation, this object can be used for convergence diagnostic.
- Unconditional: A list of unconditional effect sizes, covParm and ProbES obtained based on between and within cluster variances from the unconditional model (model with only the intercept as a fixed effect).

Examples

```
if(interactive()){

  data(mstData)

  ########################################################
  ## Bayesian analysis of cluster randomised trials     ##
  ########################################################

  output <- mstBayes(Posttest~ Intervention+Prettest,random="School",
                     intervention="Intervention",nsim=2000,data=mstData)

  ### Fixed effects
  beta <- output$Beta
  beta

  ### Effect size
  ES1 <- output$ES
  ES1

  ## Covariance matrix
  covParm <- output$covParm
  covParm

  ### plot random effects for schools

  plot(output)

 ### plot posterior probability of an effect size to be bigger than a pre-specified threshold

  plot(output,group=1)
}
```

---

mstData *Multisite Trial Data.*

Description

A multisite trial dataset containing 54 schools. This data contains a random sample of test data of pupils and not actual trial data.

Format

A data frame with 210 rows and 5 variables

Details

- Posttest: posttest scores
- Prettest: prettest scores
- Intervention: the indicator for the intervention groups in a two arm trial, coded as 1 for intervention group and 0 for control group.
- Intervention2: a simulated indicator for intervention groups in a three arm trial.
- School: numeric school identifier

`mstFREQ` *Analysis of Multisite Randomised Education Trials using Multilevel Model under a Frequentist Setting.*

Description

`mstFREQ` performs analysis of multisite randomised education trials using a multilevel model under a frequentist setting.

Usage

```
mstFREQ(formula, random, intervention, baseln, nPerm, data, seed, nBoot)
```

Arguments

`formula`	the model to be analysed is of the form y ~ x1+x2+.... Where y is the outcome variable and Xs are the independent variables.
`random`	a string variable specifying the "clustering variable" as contained in the data. See example below.
`intervention`	a string variable specifying the "intervention variable" as appearing in the formula and the data. See example below.
`baseln`	A string variable allowing the user to specify the reference category for intervention variable. When not specified, the first level will be used as a reference.
`nPerm`	number of permutations required to generate permutated p-value.
`data`	data frame containing the data to be analysed.
`seed`	seed required for bootstrapping and permutation procedure, if not provided default seed will be used.
`nBoot`	number of bootstraps required to generate bootstrap confidence intervals.

Value

S3 object; a list consisting of

- `Beta`: Estimates and confidence intervals for variables specified in the model.
- `ES`: Conditional Hedge's g effect size (ES) and its 95
- `covParm`: A list of variance decomposition into between cluster variance-covariance matrix (schools and school by intervention) and within cluster variance (Pupils). It also contains intra-cluster correlation (ICC).
- `SchEffects`: A vector of the estimated deviation of each school from the intercept and intervention slope.
- `Perm`: A "nPerm x 2w" matrix containing permutated effect sizes using residual variance and total variance. "w" denotes number of intervention. "w=1" for two arm trial and "w=2" for three arm trial excluding the control group. It is produced only when `nPerm` is specified.
- `Bootstrap`: A "nBoot x 2w" matrix containing the bootstrapped effect sizes using residual variance (Within) and total variance (Total). "w" denotes number of intervention. "w=1" for two arm trial and "w=2" for three arm trial excluding the control group. It is only prduced when `nBoot` is specified.
- `Unconditional`: A list of unconditional effect sizes, covParm, Perm and Bootstrap obtained based on variances from the unconditional model (model with only the intercept as a fixed effect).

Examples

```
if(interactive()){

data(mstData)

#########################################################
## MLM analysis of multisite trials + 1.96SE ##
#########################################################

output1 <- mstFREQ(Posttest~ Intervention+Prettest,random="School",
intervention="Intervention",data=mstData)


### Fixed effects
beta <- output1$Beta
beta

### Effect size
ES1 <- output1$ES
ES1

## Covariance matrix
covParm <- output1$covParm
covParm

### plot random effects for schools
```

```
plot(output1)

##############################################
## MLM analysis of multisite trials          ##
## with bootstrap confidence intervals       ##
##############################################

output2 <- mstFREQ(Posttest~ Intervention+Prettest,random="School",
intervention="Intervention",nBoot=1000,data=mstData)

tp <- output2$Bootstrap
### Effect size

ES2 <- output2$ES
ES2

### plot bootstrapped values

plot(output2, group=1)

#########################################################################
## MLM analysis of mutltisite trials with permutation p-value##
#########################################################################

output3 <- mstFREQ(Posttest~ Intervention+Prettest,random="School",
intervention="Intervention",nPerm=1000,data=mstData)

ES3 <- output3$ES
ES3

#### plot permutated values

plot(output3, group=1)
}
```

`plot.eefAnalytics` *A plot method for an eefAnalytics S3 object obtained from the eefAnalytics package.*

Description

Plots different figures based on output from eefAnalytics package.

Usage

```
## S3 method for class 'eefAnalytics'
plot(x, group, Conditional = TRUE, ES_Total = TRUE, slope = FALSE, ...)
```

Arguments

x	an output object from the eefAnalytics package.
group	a string/scalar value indicating which intervention to plot. This must be one of the values of intervention variable excluding the control group. For a two arm trial, the maximum number of values to consider is 1 and 2 for three arm trial.
Conditional	a logical value to indicate whether to plot the conditional effect size. The default is Conditional=TRUE, otherwise Conditional=FALSE should be specified for plot based on the unconditional effect size. Conditional variance is total or residual variance from a multilevel model with fixed effects, whilst unconditional variance is total variance or residual variance from a multilevel model with only intercept as fixed effect.
ES_Total	A logical value indicating whether to plot the effect size based on total variance or within school variance. The default is ES_Total=TRUE, to plot the effect size using total variance. ES_Total=FALSE should be specified for the effect size based on within school or residuals variance.
slope	A logical value indicating whether to return the plot of random intercept (default is slope=FALSE). return other school-by-intervention interaction random slope (s) is slope=TRUE. This argument is suitable only for mstBayes and mstFREQ functions.
...	arguments passed to plot.default

Details

Plot produces a graphical visualisation depending on which model is fitted:

- For srtFREQ(), plot can only be used when nBoot or nPerm is specified to visualise the distribution of bootstrapped or permutated values.
- For crtFREQ() or mstFREQ(), plot shows the distribution of random intercepts when group=NULL. It produces histogram of permutated or bootstrapped values when group is specified and either nBoot or nPerm is also specified.

Value

Returns relevant plots for each model.

Examples

```
if(interactive()){

#### read data
data(mstData)
data(crtData)


###############
##### SRT #####
###############
```

```
##### Bootstrapped

outputSRTBoot <- srtFREQ(Posttest~ Intervention + Prettest,
                         intervention = "Intervention",nBoot=1000, data = mstData)
plot(outputSRTBoot,group=1)

##### Permutation
outputSRTPerm <- srtFREQ(Posttest~ Intervention + Prettest,
                         intervention = "Intervention",nPerm=1000, data = mstData)

plot(outputSRTPerm,group=1)


###############
##### MST #####
###############


#### Random intercepts
outputMST <- mstFREQ(Posttest~ Intervention + Prettest,
                     random = "School", intervention = "Intervention", data = mstData)
plot(outputMST)


#### Bootstrapped
outputMSTBoot <- mstFREQ(Posttest~ Intervention + Prettest,
                         random = "School", intervention = "Intervention",
                         nBoot = 1000, data = mstData)

plot(outputMSTBoot)
plot(outputMSTBoot,group=1)

#### Permutation
outputMSTPerm <- mstFREQ(Posttest~ Intervention + Prettest,
                         random = "School", intervention = "Intervention",
                         nPerm = 1000, data = mstData)
plot(outputMSTPerm)
plot(outputMSTPerm,group=1)



###############
##### CRT #####
###############

#### Random intercepts
outputCRT <- crtFREQ(Posttest~ Intervention + Prettest, random = "School",
                     intervention = "Intervention", data = crtData)
plot(outputCRT)


## Bootstrapped
outputCRTBoot <- crtFREQ(Posttest~ Intervention + Prettest, random = "School",
```

```
                          intervention = "Intervention", nBoot = 1000, data = crtData)

plot(outputCRTBoot,group=1)


##Permutation
outputCRTPerm <- crtFREQ(Posttest~ Intervention + Prettest, random = "School",
                          intervention = "Intervention", nPerm = 1000, data = crtData)

plot(outputCRTPerm,group=1)
}
```

`print.eefAnalytics` *Print for a fitted model represented by an* `eefAnalytics` *object.*

Description

Print for a fitted model represented by an `eefAnalytics` object.

Usage

```
## S3 method for class 'eefAnalytics'
print(x, ...)
```

Arguments

`x`	Object of class `eefAnalytics`
`...`	Additional arguments of `print`

Value

Print conditional and unconditional effect sizes.

`srtBayes` *Analysis of Simple Randomised Education Trials using Bayesian Linear Regression Model with Vague Priors.*

Description

`srtBayes` performs analysis of educational trials under the assumption of independent errors among pupils using Bayesian framework with Stan. This can also be used with schools as fixed effects.

Usage

```
srtBayes(
  formula,
  intervention,
  baseln,
  adaptD,
  nsim = 2000,
  data,
  threshold = 1:10/10,
  ...
)
```

Arguments

formula	The model to be analysed is of the form y~x1+x2+.... Where y is the outcome variable and Xs are the independent variables.
intervention	A string variable specifying the "intervention variable" as appearing in the formula and the data. See example below.
baseln	A string variable allowing the user to specify the reference category for intervention variable. When not specified, the first level will be used as a reference.
adaptD	As this function uses rstanarm, this term provides the target average proposal acceptance probability during Stan's adaptation period. Default is NULL.
nsim	A number of MCMC iterations per chain. Default is 2000.
data	Data frame containing the data to be analysed.
threshold	a scalar or vector of pre-specified threshold(s) for estimating Bayesian posterior probability such that the observed effect size is greater than or equal to the threshold(s).
...	Additional arguments of stan_glm to be passed to the function.

Value

S3 object; a list consisting of

- Beta: Estimates and credible intervals for the variables specified in the model. Use summary.eefAnalytics to get Rhat and effective sample size for each estimate.
- ES: Conditional Hedges' g effect size and its 95
- sigma2: Residual variance.
- ProbES: A matrix of Bayesian posterior probabilities such that the observed effect size is greater than or equal to a pre-specified threshold(s).
- Model: A stan_glm object used in ES computation, this object can be used for convergence diagnostic.
- Unconditional: A list of unconditional effect sizes, sigma2 and ProbES obtained based on residual variance from the unconditional model (model with only the intercept as a fixed effect).

Examples

```
if(interactive()){

data(mstData)

#########################################################
## Bayesian analysis of cluster randomised trials     ##
#########################################################

output <- srtBayes(Posttest~ Intervention+Prettest,
intervention="Intervention",nsim=2000,data=mstData)

### Fixed effects
beta <- output$Beta
beta

### Effect size
ES1 <- output$ES
ES1

## Covariance matrix
covParm <- output$covParm
covParm

### plot random effects for schools

plot(output)

### plot posterior probability of an effect size to be bigger than a pre-specified threshold

plot(output,group=1)
}
```

`srtFREQ` *Analysis of Simple Randomised Education Trial using Linear Regression Model.*

Description

`srtFREQ` performs analysis of educational trials under the assumption of independent errors among pupils. This can also be used with schools as fixed effects.

Usage

```
srtFREQ(formula, intervention, baseln, nBoot, nPerm, seed, data)
```

Arguments

`formula`	the model to be analysed is of the form y~x1+x2+.... Where y is the outcome variable and Xs are the independent variables.

intervention	a string variable specifying the "intervention variable" as appearing in the formula and the data. See example below.
baseln	A string variable allowing the user to specify the reference category for intervention variable. When not specified, the first level will be used as a reference.
nBoot	number of bootstraps required to generate bootstrap confidence intervals.
nPerm	number of permutations required to generate permutated p-value.
seed	seed required for bootstrapping and permutation procedure, if not provided default seed will be used.
data	data frame containing the data to be analysed.

Value

S3 object; a list consisting of

- Beta: Estimates and confidence intervals for the variables specified in the model.
- ES: Conditional Hedges'g effect size and its 95
- sigma2: Residual variance.
- Perm: A "nPerm x w" matrix containing permutated effect sizes using residual variance. "w" denotes number of intervention. "w=1" for two arm trial and "w=2" for three arm trial excluding the control group. It is produced only if nPerm is specified.
- Bootstrap: A "nBoot x w" matrix containing the bootstrapped effect sizes using residual variance. "w" denotes number of intervention. "w=1" for two arm trial and "w=2" for three arm trial excluding the control group. It is produced only if nBoot is specified.
- Unconditional: A list of unconditional effect size, sigma2, Perm and Bootstrap obtained based on variances from the unconditional model (model with only intercept as fixed effect).

Examples

```
if(interactive()){

data(mstData)

######################################################################
## Analysis of simple randomised trials using Hedges Effect Size ##
######################################################################

output1 <- srtFREQ(Posttest~ Intervention+Prettest,
intervention="Intervention",data=mstData )
ES1 <- output1$ES
ES1

######################################################################
## Analysis of simple randomised trials using Hedges Effect Size ##
## with Permutation p-value                                     ##
######################################################################

output2 <- srtFREQ(Posttest~ Intervention+Prettest,
intervention="Intervention",nPerm=1000,data=mstData )
```

```
ES2 <- output2$ES
ES2


#### plot permutated values

plot(output2, group=1)



######################################################################
## Analysis of simple randomised trials using Hedges Effect Size ##
## with non-parametric bootstrap confidence intervals            ##
######################################################################

output3 <- srtFREQ(Posttest~ Intervention+Prettest,
intervention="Intervention",nBoot=1000,data=mstData)

ES3 <- output3$ES
ES3

### plot bootstrapped values

plot(output3, group=1)

######################################################################
## Analysis of simple randomised trials using Hedges' effect size  ##
##  with schools as fixed effects                                  ##
######################################################################

output4 <- srtFREQ(Posttest~ Intervention+Prettest+as.factor(School),
intervention="Intervention",data=mstData )

ES4 <- output4$ES
ES4

######################################################################
## Analysis of simple randomised trials using Hedges' effect size ##
## with schools as fixed effects and with permutation p-value     ##
######################################################################

output5 <- srtFREQ(Posttest~ Intervention+Prettest+as.factor(School),
intervention="Intervention",nPerm=1000,data=mstData )

ES5 <- output5$ES
ES5

#### plot permutated values

plot(output5, group=1)

######################################################################
```

```
## Analysis of simple randomised trials using Hedges' effect size ##
## with schools as fixed effects and with permutation p-value      ##
#####################################################################

output6 <- srtFREQ(Posttest~ Intervention+Prettest+as.factor(School),
intervention="Intervention",nBoot=1000,data=mstData)

ES6 <- output6$ES
ES6

### plot bootstrapped values

plot(output6, group=1)
}
```

`summary.eefAnalytics` *Summary for a fitted model represented by an* `eefAnalytics` *object.*

Description

Summary for a fitted model represented by an `eefAnalytics` object.

Usage

```
## S3 method for class 'eefAnalytics'
summary(object, ...)
```

Arguments

`object`	Object of class `eefAnalytics`
`...`	Additional arguments of `summary`

Value

Returns relevant summary including Rhat and effective sample sizes.

Index