

Package ‘bfw’

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Title Bayesian Framework for Computational Modeling

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Maintainer Øystein Olav Skaar <bayesianfw@gmail.com>

Description Derived from the work of Kruschke (2015, <ISBN:9780124058880>), the present package aims to provide a framework for conducting Bayesian analysis using Markov chain Monte Carlo (MCMC) sampling utilizing the Just Another Gibbs Sampler ('JAGS', Plummer, 2003, <<https://mcmc-jags.sourceforge.io>>). The initial version includes several modules for conducting Bayesian equivalents of chi-squared tests, analysis of variance (ANOVA), multiple (hierarchical) regression, softmax regression, and for fitting data (e.g., structural equation modeling).

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URL <https://github.com/oeysan/bfw/>

BugReports <https://github.com/oeysan/bfw/issues/>

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Imports circlize (>= 0.4.4), coda (>= 0.19-1), data.table (>= 1.12.2), dplyr (>= 0.7.7), ggplot2 (>= 2.2.1), graphics, grDevices, grid, magrittr (>= 1.5), MASS (>= 7.3-47), officer (>= 0.3.1), parallel, plyr (>= 1.8.4), png (>= 0.1-7), runjags (>= 2.0.4-2), rvg (>= 0.1.9), scales (>= 0.5.0), stats, utils

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Config/testthat/edition 3**Author** Øystein Olav Skaar [aut, cre]**Repository** CRAN**Date/Publication** 2022-02-22 14:20:02 UTC**R topics documented:**

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AddNames	<i>Add Names</i>
----------	------------------

Description

Add names to columns from naming list

Usage

```
AddNames(
  par,
  job.names,
  job.group = NULL,
  keep.par = TRUE,
  names.only = FALSE,
  ...
)
```

Arguments

par	defined parameter to analyze (e.g., "cor[1,2]")
job.names	names of all parameters in analysis, Default: NULL
job.group	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
keep.par	logical, indicating whether or not to keep parameter name (e.g., "cor[1,2]"), Default: TRUE
names.only	logical, indicating whether or not to return vector (TRUE) or string with separator (e.g., "cor[1,2]: A vs. B"), Default: FALSE
...	further arguments passed to or from other methods

Examples

```
par <- "cor[1,2]"
job.names <- c("A","B")
AddNames(par, job.names, keep.par = TRUE)
# [1] "cor[1,2]: A vs. B"
AddNames(par, job.names, keep.par = FALSE)
# [1] "A vs. B"
AddNames(par, job.names, names.only = TRUE)
# [1] "A" "B"
```

bfw

Settings

Description

main settings for bfw

Usage

```
bfw(
  job.title = NULL,
  job.group = NULL,
  jags.model,
  jags.seed = NULL,
  jags.method = NULL,
  jags.chains = NULL,
  custom.function = NULL,
  custom.model = NULL,
  params = NULL,
  saved.steps = 10000,
  thinned.steps = 1,
  adapt.steps = NULL,
  burnin.steps = NULL,
  initial.list = list(),
  custom.name = NULL,
  project.name = "Project",
  project.dir = "Results/",
  project.data = NULL,
  time.stamp = TRUE,
  save.data = FALSE,
  data.set = "AllData",
  data.format = "csv",
  raw.data = FALSE,
  run.robust = FALSE,
  merge.MCMC = FALSE,
  run.diag = FALSE,
  sep = ",")
```

```

    silent = FALSE,
    ...
)

```

Arguments

<code>job.title</code>	title of analysis, Default: NULL
<code>job.group</code>	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
<code>jags.model</code>	specify which module to use
<code>jags.seed</code>	specify seed to replicate a analysis, Default: NULL
<code>jags.method</code>	specify method for JAGS (e.g., parallel or simple), Default: NULL
<code>jags.chains</code>	specify specify number of chains for JAGS, Default: NULL
<code>custom.function</code>	custom function to use (e.g., defined function, external R file or string with function), Default: NULL
<code>custom.model</code>	define a custom model to use (e.g., string or text file (.txt), Default: NULL
<code>params</code>	define parameters to observe, Default: NULL
<code>saved.steps</code>	define the number of iterations/steps/chains in the MCMC simulations, Default: 10000
<code>thinned.steps</code>	save every kth step of the original saved.steps, Default: 1
<code>adapt.steps</code>	the number of adaptive iterations to use at the start of each simulation, Default: NULL
<code>burnin.steps</code>	the number of burnin iterations, NOT including the adaptive iterations to use for the simulation, Default: NULL
<code>initial.list</code>	initial values for analysis, Default: list()
<code>custom.name</code>	custom name of project, Default: NULL
<code>project.name</code>	name of project, Default: 'Project'
<code>project.dir</code>	define where to save data, Default: 'Results/'
<code>project.data</code>	define data to use for analysis (e.g., csv, rda, custom data.frame or matrix, or data included in package, Default: NULL
<code>time.stamp</code>	logical, indicating whether or not to append unix time stamp to file name, Default: TRUE
<code>save.data</code>	logical, indicating whether or not to save data, Default: FALSE
<code>data.set</code>	define subset of data, Default: 'AllData'
<code>data.format</code>	define what data format is being used, Default: 'csv'
<code>raw.data</code>	logical, indicating whether or not to use unprocessed data, Default: FALSE
<code>run.robust</code>	logical, indicating whether or not robust analysis, Default: FALSE
<code>merge.MCMC</code>	logical, indicating whether or not to merge MCMC chains, Default: FALSE
<code>run.diag</code>	logical, indicating whether or not to run diagnostics, Default: FALSE
<code>sep</code>	symbol to separate data (e.g., comma-delimited), Default: ','
<code>silent</code>	logical, indicating whether or not to run analysis without output, Default: FALSE
<code>...</code>	further arguments passed to or from other methods

Details

Settings act like the main framework for `bfw`, connecting function, model and JAGS.

Value

data from MCMC [RunMCMC](#)

See Also

[head](#), [modifyList](#), [capture.output](#)

CapWords

Capitalize Words

Description

capitalize the first letter in each words in a string

Usage

```
CapWords(s, strict = FALSE)
```

Arguments

<code>s</code>	string
<code>strict</code>	logical, indicating whether or not string it set to title case , Default: FALSE

Value

returns capitalized string

Examples

```
CapWords("example eXAMPLE", FALSE)
# [1] "Example EXAMPLE"
CapWords("example eXAMPLE", TRUE)
# [1] "Example Example"
```

Cats	<i>Dataset with Cats</i>
------	--------------------------

Description

Shamelessly adapted from Field (2017).

Usage

Cats

Format

A data frame with 2000 rows and 4 variables:

Reward integer Food or Affection

Dance integer Yes or No

Alignment integer Good or Evil

Ratings double Cats rate their owners (average of multiple seven-point Likert-type scale (1 = Hate ... 7 = Love))

Details

Example data for BFW

ChangeNames	<i>Change Names</i>
-------------	---------------------

Description

Change names, colnames or rownames of single items or a list of items

Usage

```
ChangeNames(  
  x,  
  names,  
  single.items = FALSE,  
  row.names = FALSE,  
  param = NULL,  
  where = NULL,  
  environment = NULL  
)
```

Arguments

x	list, vector, matrix, dataframe or a list of such items
names	names to insert
single.items	logical, indicating whether or not to use names rather than colnames or rownames, Default: FALSE
row.names	logical, indicating whether or not to use rownames rather than colnames, Default: FALSE
param	Variable name, Default: NULL
where	select parents, Default: NULL
environment	select reference environment, Default: NULL

Value

returns Named items # ABC <- c("1","2","3") # "1" "2" "3" # ChangeNames(ABC, names = c("A","B","C"), single.items = TRUE) # A B C # "1" "2" "3"

 ComputeHDI

Compute HDI

Description

Compute highest density interval (HDI) from posterior output

Usage

```
ComputeHDI(data, credible.region)
```

Arguments

data	data to compute HDI from
credible.region	summarize uncertainty by defining a region of most credible values (e.g., 95 percent of the distribution), Default: 0.95

Details

values within the HDI have higher probability density than values outside the HDI, and the values inside the HDI have a total probability equal to the credible region (e.g., 95 percent).

Value

Return HDI

Examples

```

set.seed(1)
data <- rnorm(100, 0, 1)
credible.region <- 0.95
ComputeHDI(data, credible.region)
# HDIlo HDIhi
# -1.99 1.60

```

ContrastNames

Contrast Names

Description

utilize the AddNames function to create contrast names

Usage

```
ContrastNames(items, job.names, col.names)
```

Arguments

items	items to create names for
job.names	names of all parameters in analysis, Default: NULL
col.names	columns in MCMC to create names from

DiagMCMC

Diagnose MCMC

Description

MCMC convergence diagnostics

Usage

```

DiagMCMC(
  data.MCMC,
  par.name,
  job.names,
  job.group,
  credible.region = 0.95,
  monochrome = TRUE,
  plot.colors = c("#495054", "#e3e8ea")
)

```

Arguments

<code>data.MCMC</code>	MCMC chains to diagnose
<code>par.name</code>	parameter to analyze
<code>job.names</code>	names of all parameters in analysis, Default: NULL
<code>job.group</code>	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
<code>credible.region</code>	summarize uncertainty by defining a region of most credible values (e.g., 95 percent of the distribution), Default: 0.95
<code>monochrome</code>	logical, indicating whether or not to use monochrome colors, else use DistinctColors , Default: TRUE
<code>plot.colors</code>	range of color to use, Default: <code>c("#495054", "#e3e8ea")</code>

Value

list of diagnostic plots

See Also

[dev.new](#), [colorRampPalette](#), [recordPlot](#), [graphics.off](#), [dev.list](#), [dev.off](#) `par`, [layout](#), [plot.new](#), [matplot](#), [abline](#), [text](#), [traceplot](#), [gelman.plot](#), [effectiveSize](#) `sd`, [acf](#), [density](#)

DistinctColors

Distinct Colors

Description

create vector containing Hex color codes

Usage

```
DistinctColors(range, random = FALSE)
```

Arguments

<code>range</code>	number of colors as sequence
<code>random</code>	logical, indicating whether or not to provide random colors, Default: FALSE

Examples

```
DistinctColors(1:3)
# [1] "#FFFF00" "#1CE6FF" "#FF34FF"
set.seed(1)
DistinctColors(1:3, TRUE)
# [1] "#575329" "#CB7E98" "#D86A78"
```

ETA

ETA

Description

Print estimated time for arrival (ETA)

Usage

```
ETA(start.time, i, total, results = NULL)
```

Arguments

<code>start.time</code>	start time (preset variable with <code>Sys.time()</code>)
<code>i</code>	incremental steps towards total
<code>total</code>	total number of steps
<code>results</code>	message to display, Default: NULL

See Also

[flush.console](#)

FileName

File Name

Description

simple function to construct a file name for data

Usage

```
FileName(  
  project = "Project",  
  subset = NULL,  
  type = NULL,  
  name = NULL,  
  unix = TRUE,  
  ...  
)
```

Arguments

project	name of project, Default: 'Project'
subset	define subset of data, Default: NULL
type	type of data, Default: NULL
name	save name, Default: NULL
unix	logical, indicating whether or not to append unix timestamp, Default: TRUE
...	further arguments passed to or from other methods

Examples

```

FileName()
# [1] "Project-Name-1528834963"

FileName(project = "Project" ,
         subset = "subset" ,
         type = "longitudinal" ,
         name = "cheese" ,
         unix = FALSE)
# [1] "Projectsubset-longitudinal-cheese"

```

FindEnvironment	<i>Find Environment</i>
-----------------	-------------------------

Description

Find the environment of a selected variable.

Usage

```
FindEnvironment(x, where = NULL)
```

Arguments

x	any type of named object
where	select reference environment, Default: NULL

Value

returns Found environment, Default: R_GlobalEnv.

FlattenList	<i>Flatten List</i>
-------------	---------------------

Description

flatten a nested list into a single list

Usage

```
FlattenList(li, rm.duplicated = TRUE, unname.li = TRUE, rm.empty = TRUE)
```

Arguments

li	list to flatten
rm.duplicated	logical, indicating whether or not to remove duplicated lists, Default: TRUE
unname.li	logical, indicating whether or not to unname lists, Default: TRUE
rm.empty	logical, indicating whether or not to remove empty lists, Default: TRUE

Examples

```
li <- list(LETTERS[1:3],
          list(letters[1:3],
              list(LETTERS[4:6])),
          DEF = letters[4:6],
          LETTERS[1:3],
          list() # Empty list
)
print(li)
# [[1]]
# [1] "A" "B" "C"
#
# [[2]]
# [[2]][[1]]
# [1] "a" "b" "c"
#
# [[2]][[2]]
# [[2]][[2]][[1]]
# [1] "D" "E" "F"
#
#
# $DEF
# [1] "d" "e" "f"
#
# [[4]]
# [1] "A" "B" "C"
#
# [[5]]
# list()
```

```
FlattenList(li)
# [[1]]
# [1] "A" "B" "C"
#
# [[2]]
# [1] "a" "b" "c"
#
# [[3]]
# [1] "D" "E" "F"
#
# [[4]]
# [1] "d" "e" "f"
```

GammaDist

Gamma Distribution

Description

compute gamma distribution (shape and rate) from mode and standard deviation

Usage

```
GammaDist(mode, sd)
```

Arguments

mode	mode from data
sd	standard deviation from data

Examples

```
GammaDist(1,0.5)
# $shape
# [1] 5.828427
# $rate
# [1] 4.828427
```

GetRange

Get Range

Description

simple function to extract columns from data frame

Usage

```
GetRange(var, range = 1:8, df)
```

Arguments

var variable of interest (e.g., V)
 range range of variables with same stem name (e.g., V1, V2, ..., V8) , Default: 1:8
 df data to extract from

Examples

```
data <- as.data.frame(matrix(1:80,ncol=8))
GetRange("V", c(1,4), data)
#   V1 V4
# 1   1 31
# 2   2 32
# 3   3 33
# 4   4 34
# 5   5 35
# 6   6 36
# 7   7 37
# 8   8 38
# 9   9 39
# 10 10 40
```

 Interleave

Interleave

Description

mix vectors by alternating between them

Usage

```
Interleave(a, b)
```

Arguments

a first vector
 b second vector

Value

mixed vector

Examples

```
a <- 1:3
b <- LETTERS[1:3]
Interleave(a,b)
# [1] "1" "A" "2" "B" "3" "C"
```

`InverseHDI`*Compute Inverse HDI*

Description

Compute inverse cumulative density function of the distribution

Usage

```
InverseHDI(  
  beta,  
  shape1,  
  shape2,  
  credible.region = 0.95,  
  tolerance = 0.00000001  
)
```

Arguments

<code>beta</code>	density, distribution function, quantile function and random generation for the Beta distribution with parameters <code>shape1</code> and <code>shape2</code>
<code>shape1</code>	non-negative parameter of the Beta distribution.
<code>shape2</code>	non-negative parameter of the Beta distribution.
<code>credible.region</code>	summarize uncertainty by defining a region of most credible values (e.g., 95 percent of the distribution), Default: 0.95
<code>tolerance</code>	the desired accuracy, Default: 1e-8

Details

values within the HDI have higher probability density than values outside the HDI, and the values inside the HDI have a total probability equal to the credible region (e.g., 95 percent).

Value

Return HDI

See Also

[Beta](#), [optimize](#)

Examples

```
InverseHDI( qbeta , 554 , 149 )  
# HDIlo HDIhi  
# 0.758 0.818
```

Layout

Layout

Description

collection of layout sizes

Usage

```
Layout(x = "a4", layout.inverse = FALSE)
```

Arguments

`x` type of layout, Default: 'a4'
`layout.inverse` logical, indicating whether or not to inverse layout (e.g., landscape) , Default: FALSE

Value

width and height of select medium

Examples

```
Layout()  
# [1] 8.3 11.7
```

MatrixCombn

Matrix Combinations

Description

Create matrices from combinations of columns

Usage

```
MatrixCombn(  
  matrix,  
  first.stem,  
  last.stem = NULL,  
  q.levels,  
  rm.last = TRUE,  
  row.means = TRUE  
)
```

Arguments

<code>matrix</code>	matrix to combine
<code>first.stem</code>	first name of columns to use (e.g., "m" for mean)
<code>last.stem</code>	optional last name of columns to use (e.g., "p" for proportions) , Default: NONE
<code>q.levels</code>	number of levels per column
<code>rm.last</code>	logical, indicating whether or not to remove last combination (i.e., m1m2m3m4) , Default: TRUE
<code>row.means</code>	logical, indicating whether or not to compute row means from combined columns, else use row sums, Default: TRUE

MergeMCMC

Merge MCMC

Description

Merge two or more MCMC simulations

Usage

```
MergeMCMC(pat, project.dir = "Results/", data.sets)
```

Arguments

<code>pat</code>	pattern to select MCMC chain from
<code>project.dir</code>	define where to save data, Default: 'Results/'
<code>data.sets</code>	data sets to combine

Value

Merged MCMC chains

See Also

[head combine.mcmc](#)

MultiGrep

Multi Grep

Description

Use multiple patterns from vector to find element in another vector, with option to remove certain patterns

Usage

```
MultiGrep(find, from, remove = NULL, value = TRUE)
```

Arguments

find	vector to find
from	vector to find from
remove	variables to remove, Default: NULL
value	logical, if TRUE returns value, Default: TRUE

Normalize

Normalize

Description

simple function to normalize data

Usage

```
Normalize(x)
```

Arguments

x	numeric vector to normalize
---	-----------------------------

Examples

```
Normalize(1:10)
# [1] 0.0182 0.0364 0.0545 0.0727 0.0909
# 0.1091 0.1273 0.1455 0.1636 0.1818
```

PadVector

Pad Vector

Description

Pad a numeric vector according to the highest value

Usage

```
PadVector(v)
```

Arguments

v numeric vector to pad

Examples

```
PadVector(1:10)
# [1] "01" "02" "03" "04" "05" "06" "07" "08" "09" "10"
```

ParseNumber

Parse Numbers

Description

simple function to extract numbers from string/vector

Usage

```
ParseNumber(x, digits = FALSE)
```

Arguments

x string or vector
digits logical, indicating whether or not to extract decimals, Default: FALSE

See Also

[na.omit](#)

Examples

```
ParseNumber("String1WithNumbers2")
# [1] 1 2
```

ParsePlot

*Parse Plot***Description**

Display and/or save plots

Usage

```
ParsePlot(
  plot.data,
  project.dir = "Results/",
  project.name = FileName(name = "Print"),
  graphic.type = "pdf",
  plot.size = "15,10",
  scaling = 100,
  plot.aspect = NULL,
  save.data = FALSE,
  vector.graphic = FALSE,
  point.size = 12,
  font.type = "serif",
  one.file = TRUE,
  ppi = 300,
  units = "in",
  layout = "a4",
  layout.inverse = FALSE,
  return.files = FALSE,
  ...
)
```

Arguments

<code>plot.data</code>	a list of plots
<code>project.dir</code>	define where to save data, Default: 'Results/'
<code>project.name</code>	define name of project, Default: 'FileName(name="Print")'
<code>graphic.type</code>	type of graphics to use (e.g., pdf, png, ps), Default: 'pdf'
<code>plot.size</code>	size of plot, Default: '15,10'
<code>scaling</code>	scale size of plot, Default: 100
<code>plot.aspect</code>	aspect of plot, Default: NULL
<code>save.data</code>	logical, indicating whether or not to save data, Default: FALSE
<code>vector.graphic</code>	logical, indicating whether or not visualizations should be vector or raster graphics, Default: FALSE
<code>point.size</code>	point size used for visualizations, Default: 12
<code>font.type</code>	font type used for visualizations, Default: 'serif'

<code>one.file</code>	logical, indicating whether or not visualizations should be placed in one or several files, Default: TRUE
<code>ppi</code>	define pixel per inch used for visualizations, Default: 300
<code>units</code>	define unit of length used for visualizations, Default: 'in'
<code>layout</code>	define a layout size for visualizations, Default: 'a4'
<code>layout.inverse</code>	logical, indicating whether or not to inverse layout (e.g., landscape) , Default: FALSE
<code>return.files</code>	logical, indicating whether or not to return saved file names
<code>...</code>	further arguments passed to or from other methods

See Also

[dev](#), [png](#), [ps.options](#), [recordPlot](#) [head](#) [readPNG](#) [par](#), [plot](#), [rasterImage](#) [read_pptx](#), [add_slide](#), [ph_with dml](#)

Examples

```
# Create three plots
plot.data <- lapply(1:3, function (i) {
  # Open new device
  grDevices::dev.new()
  # Print plot
  plot(1:i)
  # Record plot
  p <- grDevices::recordPlot()
  # Turn off graphics device drive
  grDevices::dev.off()
  return (p)
} )

# Print plots
ParsePlot(plot.data)
```

PlotCirclize

Circlize Plot

Description

Create a circlize plot

Usage

```
PlotCirclize(
  data,
  category.spacing = 1.2,
  category.inset = c(-0.4, 0),
  monochrome = TRUE,
```

```

    plot.colors = c("#CCCCCC", "#DEDEDE"),
    font.type = "serif"
)

```

Arguments

<code>data</code>	data for circlize plot
<code>category.spacing</code>	spacing between category items , Default: 1.25
<code>category.inset</code>	inset of category items form plot , Default: c(-0.5, 0)
<code>monochrome</code>	logical, indicating whether or not to use monochrome colors, else use Distinct-Colors , Default: TRUE
<code>plot.colors</code>	range of color to use, Default: c("#CCCCCC", "#DEDEDE")
<code>font.type</code>	font type used for visualizations, Default: 'serif'

See Also

[dev](#), [recordPlot](#) [legend](#) [circos.par](#), [chordDiagram](#), [circos.trackPlotRegion](#), [circos.clear](#)

PlotData

Plot Data

Description

Plot data as violin plot visualizing density, box plots to display HDI, whiskers to display standard deviation

Usage

```
PlotData(data, data.type = "Mean", ...)
```

Arguments

<code>data</code>	data to plot data from
<code>data.type</code>	define what kind of data is being used, Default: 'Mean'
<code>...</code>	further arguments passed to or from other methods

 PlotMean

Plot Mean

Description

Create a (repeated) mean plot

Usage

```
PlotMean(
  data,
  monochrome = TRUE,
  plot.colors = c("#495054", "#e3e8ea"),
  font.type = "serif",
  run.repeated = FALSE,
  run.split = FALSE,
  y.split = FALSE,
  ribbon.plot = TRUE,
  y.text = "Score",
  x.text = NULL,
  remove.x = FALSE
)
```

Arguments

<code>data</code>	MCMC data to plot
<code>monochrome</code>	logical, indicating whether or not to use monochrome colors, else use Distinct-Colors , Default: TRUE
<code>plot.colors</code>	range of color to use, Default: <code>c("#495054", "#e3e8ea")</code>
<code>font.type</code>	font type used for visualizations, Default: 'serif'
<code>run.repeated</code>	logical, indicating whether or not to use repeated measures plot, Default: FALSE
<code>run.split</code>	logical, indicating whether or not to use split violin plot and compare distribution between groups, Default: FALSE
<code>y.split</code>	logical, indicating whether or not to split within (TRUE) or between groups, Default: FALSE
<code>ribbon.plot</code>	logical, indicating whether or not to use ribbon plot for HDI, Default: TRUE
<code>y.text</code>	label on y axis, Default: 'Score'
<code>x.text</code>	label on x axis, Default: NULL
<code>remove.x</code>	logical, indicating whether or not to show x.axis information, Default: FALSE

See Also

[ggproto](#), [ggplot2-ggproto](#), [aes](#), [margin](#), [geom_boxplot](#), [geom_crossbar](#), [geom_path](#), [geom_ribbon](#), [geom_violin](#), [ggplot](#), [scale_manual](#), [scale_x_discrete](#), [theme](#), [layer](#), [labs](#) [arrange](#), [rbind.fill](#) [zero_range](#) [grid.grob](#), [grobName](#), [unit](#) [approxfun](#) [colorRamp](#)

PlotNominal

*Plot Nominal***Description**

Create a nominal plot

Usage

```
PlotNominal(
  data,
  monochrome = TRUE,
  plot.colors = c("#CCCCCC", "#DEDEDE"),
  font.type = "serif",
  bar.dodge = 0.6,
  bar.alpha = 0.7,
  bar.width = 0.4,
  bar.extras.dodge = 0,
  bar.border = "black",
  bar.label = FALSE,
  bar.error = TRUE,
  use.cutoff = FALSE,
  diff.cutoff = 1,
  q.items = NULL
)
```

Arguments

<code>data</code>	MCMC data to plot
<code>monochrome</code>	logical, indicating whether or not to use monochrome colors, else use Distinct-Colors , Default: TRUE
<code>plot.colors</code>	range of color to use, Default: <code>c("#CCCCCC", "#DEDEDE")</code>
<code>font.type</code>	font type used for visualizations, Default: 'serif'
<code>bar.dodge</code>	distance between within bar plots, Default: 0.6
<code>bar.alpha</code>	transparency for bar plot, Default: 0.7
<code>bar.width</code>	width of bar plot, Default: 0.4
<code>bar.extras.dodge</code>	dodge of error bar and label, Default: 0
<code>bar.border</code>	color of the bar border, Default: 'black'
<code>bar.label</code>	logical, indicating whether or not to show bar labels, Default: TRUE
<code>bar.error</code>	logical, indicating whether or not to show error bars, Default: TRUE
<code>use.cutoff</code>	logical, indicating whether or not to use a cutoff for keeping plots, Default: FALSE
<code>diff.cutoff</code>	if using a cutoff, determine the percentage that expected and observed values should differ, Default: 1
<code>q.items</code>	which variables should be used in the plot. Defaults to all , Default: NULL

See Also

[aes](#), [margin](#), [geom_crossbar](#), [ggplot](#), [scale_manual](#), [theme](#)

 PlotParam

Plot Param

Description

Create a density plot with parameter values

Usage

```
PlotParam(
  data,
  param,
  ROPE = FALSE,
  monochrome = TRUE,
  plot.colors = c("#495054", "#e3e8ea"),
  font.type = "serif",
  font.size = 4.5,
  rope.line = -0.2,
  rope.tick = -0.1,
  rope.label = -0.35,
  line.size = 0.5,
  dens.zero.col = "black",
  dens.mean.col = "white",
  dens.median.col = "white",
  dens.mode.col = "black",
  dens.ropes.col = "black",
  scale = FALSE,
  y.limits = NULL,
  y.breaks = NULL,
  x.limits = NULL,
  x.breaks = NULL,
  plot.title = NULL
)
```

Arguments

<code>data</code>	MCMC data to plot
<code>param</code>	parameter of interest
<code>ROPE</code>	plot ROPE values, Default: FALSE
<code>monochrome</code>	logical, indicating whether or not to use monochrome colors, else use Distinct-Colors , Default: TRUE
<code>plot.colors</code>	range of color to use, Default: <code>c("#495054", "#e3e8ea")</code>

font.type	font type used for visualizations, Default: 'serif'
font.size	font size, Default: 4.5
rope.line	size of ROPE lien, Default: -0.2
rope.tick	distance to ROPE tick, Default: -0.1
rope.label	distance to ROPE label, Default: -0.35
line.size	overall line size, Default: 0.5
dens.zero.col	colour of line indicating zero, Default: 'black'
dens.mean.col	colour of line indicating mean value, Default: 'white'
dens.median.col	colour of line indicating median value, Default: 'white'
dens.mode.col	colour of line indicating mode value, Default: 'black'
dens.rope.col	colour of line indicating ROPE value, Default: 'black'
scale	scale x and y axis, Default: FALSE
y.limits	vector of y limits, Default: NULL
y.breaks	vector of y breaks, Default: NULL
x.limits	= vector of x limits, Default: NULL
x.breaks	= vector of x breaks, Default: NULL
plot.title	= title of plot, Default: NULL

Value

Density plot of parameter values

See Also

[mutate](#), [group_by](#), [join](#), [select](#), [slice](#), [filter](#) [approxfun](#) [aes](#), [margin](#), [geom_density](#), [geom_polygon](#), [geom_segment](#), [geom](#)

ReadFile

Read File

Description

opens connection to a file

Usage

```
ReadFile(
  file = NULL,
  path = "models/",
  package = "bfw",
  type = "string",
  sep = ",",
  data.format = "txt",
  custom = FALSE
)
```

Arguments

file	name of file, Default: NULL
path	path to file, Default: 'models/'
package	choose package to open from, Default: 'bfw'
type	Type of file (i.e., text or data), Default: 'string'
sep	symbol to separate data (e.g., comma-delimited), Default: ','
data.format	define what data format is being used, Default: 'csv'
custom	logical, indicating whether or not to use custom file, , Default: FALSE

See Also

[read.csv](#)

Examples

```
# Print JAGS model for bernoulli trials
cat(ReadFile("stats_bernoulli"))
# model {
#   for (i in 1:n){
#     x[i] ~ dbern(theta)
#   }
#   theta ~ dunif(0,1)
# }
```

RemoveEmpty

Remove Empty

Description

Remove empty elements in vector

Usage

```
RemoveEmpty(x)
```

Arguments

x vector to eliminate NA and blanks

Examples

```
RemoveEmpty( c("",NA,"", "Remains") )
# [1] "Remains"
```

RemoveGarbage	<i>Remove Garbage</i>
---------------	-----------------------

Description

Remove variable(s) and remove garbage from memory

Usage

RemoveGarbage(v)

Arguments

v variables to remove

RemoveSpaces	<i>Remove Spaces</i>
--------------	----------------------

Description

simple function to remove whitespace

Usage

RemoveSpaces(x)

Arguments

x string

Examples

```
RemoveSpaces(" No More S p a c e s")  
# [1] "NoMoreSpaces"
```

<code>RunContrasts</code>	<i>Run Contrasts</i>
---------------------------	----------------------

Description

Compute contrasts from mean and standard deviation (Cohen's d) or frequencies (odds ratio)

Usage

```
RunContrasts(contrast.type, q.levels, use.contrast, contrasts, data, job.names)
```

Arguments

<code>contrast.type</code>	type of contrast: "m" indicate means and standard deviations, "o" indicate frequency
<code>q.levels</code>	Number of levels of each variable/column
<code>use.contrast</code>	choose from "between", "within" and "mixed". Between compare groups at different conditions. Within compare a group at different conditions. Mixed compute all comparisons
<code>contrasts</code>	specified contrasts columns
<code>data</code>	data to compute contrasts from
<code>job.names</code>	names of all parameters in analysis, Default: NULL

See Also

[combn](#)

<code>RunMCMC</code>	<i>Run MCMC</i>
----------------------	-----------------

Description

Conduct MCMC simulations using JAGS

Usage

```
RunMCMC(
  jags.model,
  params = NULL,
  name.list,
  data.list,
  initial.list = list(),
  run.contrasts = FALSE,
  use.contrast = "between",
```

```

contrasts = NULL,
custom.contrast = NULL,
run.ppp = FALSE,
k.ppp = 10,
n.data,
credible.region = 0.95,
save.data = FALSE,
ROPE = NULL,
merge.MCMC = FALSE,
run.diag = FALSE,
param.diag = NULL,
sep = ",",
monochrome = TRUE,
plot.colors = c("#495054", "#e3e8ea"),
graphic.type = "pdf",
plot.size = "15,10",
scaling = 100,
plot.aspect = NULL,
vector.graphic = FALSE,
point.size = 12,
font.type = "serif",
one.file = TRUE,
ppi = 300,
units = "in",
layout = "a4",
layout.inverse = FALSE,
...
)

```

Arguments

jags.model	specify which module to use
params	define parameters to observe, Default: NULL
name.list	list of names
data.list	list of data
initial.list	initial values for analysis, Default: list()
run.contrasts	logical, indicating whether or not to run contrasts, Default: FALSE
use.contrast	choose from "between", "within" and "mixed". Between compare groups at different conditions. Within compare a group at different conditions. Mixed compute all comparisons, Default: "between",
contrasts	define contrasts to use for analysis (defaults to all) , Default: NULL
custom.contrast	define contrasts for custom models , Default: NULL
run.ppp	logical, indicating whether or not to conduct ppp analysis, Default: FALSE
k.ppp	run ppp for every kth length of MCMC chains, Default: 10
n.data	sample size for each parameter

<code>credible.region</code>	summarize uncertainty by defining a region of most credible values (e.g., 95 percent of the distribution), Default: 0.95
<code>save.data</code>	logical, indicating whether or not to save data, Default: FALSE
<code>ROPE</code>	define range for region of practical equivalence (e.g., <code>c(-0.05 , 0.05)</code>), Default: NULL
<code>merge.MCMC</code>	logical, indicating whether or not to merge MCMC chains, Default: FALSE
<code>run.diag</code>	logical, indicating whether or not to run diagnostics, Default: FALSE
<code>param.diag</code>	define parameters to use for diagnostics, default equals all parameters, Default: NULL
<code>sep</code>	symbol to separate data (e.g., comma-delimited), Default: <code>' '</code>
<code>monochrome</code>	logical, indicating whether or not to use monochrome colors, else use Distinct-Colors , Default: TRUE
<code>plot.colors</code>	range of color to use, Default: <code>c("#495054", "#e3e8ea")</code>
<code>graphic.type</code>	type of graphics to use (e.g., pdf, png, ps), Default: <code>'pdf'</code>
<code>plot.size</code>	size of plot, Default: <code>'15,10'</code>
<code>scaling</code>	scale size of plot, Default: 100
<code>plot.aspect</code>	aspect of plot, Default: NULL
<code>vector.graphic</code>	logical, indicating whether or not visualizations should be vector or raster graphics, Default: FALSE
<code>point.size</code>	point size used for visualizations, Default: 12
<code>font.type</code>	font type used for visualizations, Default: <code>'serif'</code>
<code>one.file</code>	logical, indicating whether or not visualizations should be placed in one or several files, Default: TRUE
<code>ppi</code>	define pixel per inch used for visualizations, Default: 300
<code>units</code>	define unit of length used for visualizations, Default: <code>'in'</code>
<code>layout</code>	define a layout size for visualizations, Default: <code>'a4'</code>
<code>layout.inverse</code>	logical, indicating whether or not to inverse layout (e.g., landscape) , Default: FALSE
<code>...</code>	further arguments passed to or from other methods

Value

list containing MCMC chains , MCMC chains as matrix , summary of MCMC, list of name used, list of data, the jags model, running time of analysis and names of saved files

See Also

[runjags.options](#), [run.jags.detectCores](#) as `mcmc.list`, `varnames` `rbind.fill` `cor`, `cov`, `sd` `mvrnorm` `write.table`

SingleString	<i>Single String</i>
--------------	----------------------

Description

determine whether input is a single string

Usage

```
SingleString(x)
```

Arguments

x	string
---	--------

Value

true or false

Examples

```
A <- "This is a single string"
SingleString(A)
# [1] TRUE
is.character(A)
# [1] TRUE
B <- c("This is a vector" , "containing two strings")
SingleString(B)
# [1] FALSE
is.character(B)
# [1] TRUE
```

StatsBernoulli	<i>Bernoulli Trials</i>
----------------	-------------------------

Description

Conduct bernoulli trials

Usage

```
StatsBernoulli(
  x = NULL,
  x.names = NULL,
  DF,
  params = NULL,
  initial.list = list(),
  ...
)
```

Arguments

x predictor variable(s), Default: NULL
x.names optional names for predictor variable(s), Default: NULL
DF data for analysis
params define parameters to observe, Default: NULL
initial.list initial values for analysis, Default: list()
... further arguments passed to or from other methods

See Also

[complete.cases](#)

Examples

```

## Create coin toss data: heads = 50 and tails = 50
#fair.coin<- as.matrix(c(rep("Heads",50),rep("Tails",50)))
#colnames(fair.coin) <- "X"
#fair.coin <- bfw(project.data = fair.coin,
#                 x = "X",
#                 saved.steps = 50000,
#                 jags.model = "bernoulli",
#                 jags.seed = 100,
#                 ROPE = c(0.4,0.6),
#                 silent = TRUE)
#fair.coin.freq <- binom.test( 50000 * 0.5, 50000)

## Create coin toss data: heads = 20 and tails = 80
#biased.coin <- as.matrix(c(rep("Heads",20),rep("Tails",80)))
#colnames(biased.coin) <- "X"
#biased.coin <- bfw(project.data = biased.coin,
#                  x = "X",
#                  saved.steps = 50000,
#                  jags.model = "bernoulli",
#                  jags.seed = 101,
#                  initial.list = list(theta = 0.7),
#                  ROPE = c(0.4,0.6),
#                  silent = TRUE)
#biased.coin.freq <- binom.test( 50000 * 0.8, 50000)

## Print Bayesian and frequentist results of fair coin
#fair.coin$summary.MCMC[,c(3:6,9:12)]

## Mode      ESS      HDIlo    HDIhi    ROPElo    ROPEhi    ROPEin    n
## 0.505 50480.000    0.405    0.597    2.070    2.044    95.886   100.00

#sprintf("Frequentist: %.3f [%%.3f , %%.3f], p = %%.3f" ,
#        fair.coin.freq$estimate ,
#        fair.coin.freq$conf.int[1] ,
#        fair.coin.freq$conf.int[2] ,
#        fair.coin.freq$p.value)

```

```
## [1] "Frequentist: 0.500 [0.496 , 0.504], p = 1.000"

## Print Bayesian and frequentist results of biased coin
#biased.coin$summary.MCMC[,c(3:6,9:12)]

## Mode      ESS      HDIlo      HDIhi      ROPElo      ROPEhi      ROPEin      n
## 0.803 50000.000      0.715      0.870      0.000      99.996      0.004      100.000

#sprintf("Frequentist: %.3f [%.3f , %.3f], p = %.3f" ,
#        biased.coin.freq$estimate ,
#        biased.coin.freq$conf.int[1] ,
#        biased.coin.freq$conf.int[2] ,
#        biased.coin.freq$p.value)

## [1] "Frequentist: 0.800 [0.796 , 0.803], p = 0.000"
```

StatsCovariate

Covariate

Description

Covariate estimations (including correlation and Cronbach's alpha)

Usage

```
StatsCovariate(
  y = NULL,
  y.names = NULL,
  x = NULL,
  x.names = NULL,
  DF,
  params = NULL,
  job.group = NULL,
  initial.list = list(),
  jags.model,
  ...
)
```

Arguments

<code>y</code>	criterion variable(s), Default: NULL
<code>y.names</code>	optional names for criterion variable(s), Default: NULL
<code>x</code>	predictor variable(s), Default: NULL
<code>x.names</code>	optional names for predictor variable(s), Default: NULL
<code>DF</code>	data to analyze
<code>params</code>	define parameters to observe, Default: NULL

<code>job.group</code>	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
<code>initial.list</code>	initial values for analysis, Default: list()
<code>jags.model</code>	specify which module to use
<code>...</code>	further arguments passed to or from other methods

Value

covariate, correlation and (optional) Cronbach's alpha

See Also

[complete.cases](#)

Examples

```
## Create normal distributed data with mean = 0 and standard deviation = 1
### r = 0.5
#data <- MASS::mvrnorm(n=100,
#                       mu=c(0, 0),
#                       Sigma=matrix(c(1, 0.5, 0.5, 1), 2),
#                       empirical=TRUE)
## Add names
#colnames(data) <- c("X","Y")
## Create noise with mean = 10 / -10 and sd = 1
### r = -1.0
#noise <- MASS::mvrnorm(n=2,
#                       mu=c(10, -10),
#                       Sigma=matrix(c(1, -1, -1, 1), 2),
#                       empirical=TRUE)
## Combine noise and data
#biased.data <- rbind(data,noise)
#
#
## Run analysis on normal distributed data
#mcmc <- bfw(project.data = data,
#            y = "X,Y",
#            saved.steps = 50000,
#            jags.model = "covariate",
#            jags.seed = 100,
#            silent = TRUE)
## Run robust analysis on normal distributed data
#mcmc.robust <- bfw(project.data = data,
#                  y = "X,Y",
#                  saved.steps = 50000,
#                  jags.model = "covariate",
#                  run.robust = TRUE,
#                  jags.seed = 101,
#                  silent = TRUE)
## Run analysis on data with outliers
#biased.mcmc <- bfw(project.data = biased.data,
```

```

#           y = "X,Y",
#           saved.steps = 50000,
#           jags.model = "covariate",
#           jags.seed = 102,
#           silent = TRUE)
## Run robust analysis on data with outliers
#biased.mcmc.robust <- bfw(project.data = biased.data,
#           y = "X,Y",
#           saved.steps = 50000,
#           jags.model = "covariate",
#           run.robust = TRUE,
#           jags.seed = 103,
#           silent = TRUE)
## Print frequentist results
#stats::cor(data)[2]
## [1] 0.5
#stats::cor(noise)[2]
## [1] -1
#stats::cor(biased.data)[2]
## [1] -0.498
## Print Bayesian results
#mcmc$summary.MCMC
##           Mean Median Mode   ESS HDIlo HDIhi   n
## cor[1,1]: X vs. X 1.000 1.000 0.999    0 1.000 1.000 100
## cor[2,1]: Y vs. X 0.488 0.491 0.496 19411 0.337 0.633 100
## cor[1,2]: X vs. Y 0.488 0.491 0.496 19411 0.337 0.633 100
## cor[2,2]: Y vs. Y 1.000 1.000 0.999    0 1.000 1.000 100
#mcmc.robust$summary.MCMC
##           Mean Median Mode   ESS HDIlo HDIhi   n
## cor[1,1]: X vs. X 1.00 1.000 0.999    0 1.000 1.000 100
## cor[2,1]: Y vs. X 0.47 0.474 0.491 18626 0.311 0.626 100
## cor[1,2]: X vs. Y 0.47 0.474 0.491 18626 0.311 0.626 100
## cor[2,2]: Y vs. Y 1.00 1.000 0.999    0 1.000 1.000 100
#biased.mcmc$summary.MCMC
##           Mean Median Mode   ESS HDIlo HDIhi   n
## cor[1,1]: X vs. X 1.000 1.000 0.999    0 1.000 1.000 102
## cor[2,1]: Y vs. X -0.486 -0.489 -0.505 19340 -0.627 -0.335 102
## cor[1,2]: X vs. Y -0.486 -0.489 -0.505 19340 -0.627 -0.335 102
## cor[2,2]: Y vs. Y 1.000 1.000 0.999    0 1.000 1.000 102
#biased.mcmc.robust$summary.MCMC
##           Mean Median Mode   ESS HDIlo HDIhi   n
## cor[1,1]: X vs. X 1.000 1.000 0.999    0 1.000 1.000 102
## cor[2,1]: Y vs. X 0.338 0.343 0.356 23450 0.125 0.538 102
## cor[1,2]: X vs. Y 0.338 0.343 0.356 23450 0.125 0.538 102

```

Description

Apply latent or observed models to fit data (e.g., SEM, CFA, mediation)

Usage

```
StatsFit(
  latent = NULL,
  latent.names = NULL,
  observed = NULL,
  observed.names = NULL,
  additional = NULL,
  additional.names = NULL,
  DF,
  params = NULL,
  job.group = NULL,
  initial.list = list(),
  model.name,
  jags.model,
  custom.model = NULL,
  run.ppp = FALSE,
  run.robust = FALSE,
  ...
)
```

Arguments

latent	latent variables, Default: NULL
latent.names	optional names for for latent variables, Default: NULL
observed	observed variable(s), Default: NULL
observed.names	optional names for for observed variable(s), Default: NULL
additional	supplemental parameters for fitted data (e.g., indirect pathways and total effect), Default: NULL
additional.names	optional names for supplemental parameters, Default: NULL
DF	data to analyze
params	define parameters to observe, Default: NULL
job.group	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
initial.list	initial values for analysis, Default: list()
model.name	name of model used
jags.model	specify which module to use
custom.model	define a custom model to use (e.g., string or text file (.txt), Default: NULL
run.ppp	logical, indicating whether or not to conduct ppp analysis, Default: FALSE
run.robust	logical, indicating whether or not robust analysis, Default: FALSE
...	further arguments passed to or from other methods

See Also

[complete.cases](#)

StatsKappa

Cohen's Kappa

Description

Bayesian alternative to Cohen's kappa

Usage

```
StatsKappa(  
  x = NULL,  
  x.names = NULL,  
  DF,  
  params = NULL,  
  initial.list = list(),  
  ...  
)
```

Arguments

x	predictor variable(s), Default: NULL
x.names	optional names for predictor variable(s), Default: NULL
DF	data to analyze
params	define parameters to observe, Default: NULL
initial.list	initial values for analysis, Default: list()
...	further arguments passed to or from other methods

See Also

[complete.cases](#)

Examples

```
## Simulate rater data  
#Rater1 <- c(rep(0,20),rep(1,80))  
#set.seed(100)  
#Rater2 <- c(rbinom(20,1,0.1), rbinom(80,1,0.9))  
#data <- data.frame(Rater1,Rater2)  
  
#mcmc <- bfw(project.data = data,  
#           x = "Rater1,Rater2",  
#           saved.steps = 50000,  
#           jags.model = "kappa",  
#           jags.seed = 100,  
#           silent = TRUE)  
  
## Print frequentist and Bayesian kappa
```

```

#library(psych)
#psych::cohen.kappa(data)$confid[1,]
## lower estimate upper
## 0.6137906 0.7593583 0.9049260
##' mcmc$summary.MCMC
##      Mean      Median      Mode      ESS      HDIlo      HDIhi      n
## Kappa[1]: 0.739176 0.7472905 0.7634503 50657 0.578132 0.886647 100

```

StatsMean

Mean Data

Description

Compute means and standard deviations.

Usage

```

StatsMean(
  y = NULL,
  y.names = NULL,
  x = NULL,
  x.names = NULL,
  DF,
  params = NULL,
  initial.list = list(),
  ...
)

```

Arguments

y	criterion variable(s), Default: NULL
y.names	optional names for criterion variable(s), Default: NULL
x	categorical variable(s), Default: NULL
x.names	optional names for categorical variable(s), Default: NULL
DF	User defined data frame, Default: NULL
params	define parameters to observe, Default: NULL
initial.list	Initial values for simulations, Default: list()
...	further arguments passed to or from other methods

Value

mean and standard deviation

StatsMetric

*Predict Metric***Description**

Bayesian alternative to ANOVA

Usage

```
StatsMetric(
  y = NULL,
  y.names = NULL,
  x = NULL,
  x.names = NULL,
  DF,
  params = NULL,
  job.group = NULL,
  initial.list = list(),
  model.name,
  jags.model,
  custom.model = NULL,
  run.robust = FALSE,
  ...
)
```

Arguments

<code>y</code>	criterion variable(s), Default: NULL
<code>y.names</code>	optional names for criterion variable(s), Default: NULL
<code>x</code>	categorical variable(s), Default: NULL
<code>x.names</code>	optional names for categorical variable(s), Default: NULL
<code>DF</code>	data to analyze
<code>params</code>	define parameters to observe, Default: NULL
<code>job.group</code>	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
<code>initial.list</code>	initial values for analysis, Default: list()
<code>model.name</code>	name of model used
<code>jags.model</code>	specify which module to use
<code>custom.model</code>	define a custom model to use (e.g., string or text file (.txt), Default: NULL
<code>run.robust</code>	logical, indicating whether or not robust analysis, Default: FALSE
<code>...</code>	further arguments passed to or from other methods

See Also

[complete.cases](#), [sd](#), [aggregate](#), [median](#) [head](#)

StatsNominal

*Predict Nominal***Description**

Bayesian alternative to chi-square test

Usage

```
StatsNominal(
  x = NULL,
  x.names = NULL,
  DF,
  params = NULL,
  job.group = NULL,
  initial.list = list(),
  model.name,
  jags.model,
  custom.model = NULL,
  ...
)
```

Arguments

x	categorical variable(s), Default: NULL
x.names	optional names for categorical variable(s), Default: NULL
DF	data to analyze
params	define parameters to observe, Default: NULL
job.group	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
initial.list	initial values for analysis, Default: list()
model.name	name of model used
jags.model	specify which module to use
custom.model	define a custom model to use (e.g., string or text file (.txt), Default: NULL
...	further arguments passed to or from other methods

Examples

```
## Use cats data
# mcmc <- bfw(project.data = bfw::Cats,
#           x = "Reward,Dance,Alignment",
#           saved.steps = 50000,
#           jags.model = "nominal",
#           run.contrasts = TRUE,
#           jags.seed = 100)
```

```

## Print only odds-ratio and effect sizes
#   mcmc$summary.MCMC[ grep("Odds ratio|Effect",
#                             rownames(mcmc$summary.MCMC)) , c(3:7) ]
##
##                                     Mode  ESS   HDIlo   HDIhi   n
## Effect size: Affection/Food vs. Evil/Good      0.12844 45222  0.00115  0.25510 2000
## Effect size: Affection/Food vs. No/Yes         1.05346 44304  0.90825  1.18519 2000
## Effect size: Affection/Food vs. No/Yes @ Evil  2.58578 30734  2.35471  2.85450 1299
## Effect size: Affection/Food vs. No/Yes @ Good -0.51934 35316 -0.73443 -0.30726  701
## Effect size: Food/Affection vs. Evil/Good     -0.12844 45222 -0.25510 -0.00115 2000
## Effect size: Food/Affection vs. No/Yes        -1.05346 44304 -1.18519 -0.90825 2000
## Effect size: Food/Affection vs. No/Yes @ Evil -2.58578 30734 -2.85450 -2.35471 1299
## Effect size: Food/Affection vs. No/Yes @ Good  0.51934 35316  0.30726  0.73443  701
## Effect size: No/Yes vs. Evil/Good             1.43361 43603  1.30715  1.55020 2000
## Effect size: Yes/No vs. Evil/Good            -1.43361 43603 -1.55020 -1.30715 2000
## Odds ratio: Affection/Food vs. Evil/Good      1.25432 45225  0.99311  1.57765 2000
## Odds ratio: Affection/Food vs. No/Yes         6.49442 44215  5.10392  8.46668 2000
## Odds ratio: Affection/Food vs. No/Yes @ Evil 104.20109 30523 66.55346 169.12331 1299
## Odds ratio: Affection/Food vs. No/Yes @ Good  0.36685 35417  0.25478  0.55982  701
## Odds ratio: Food/Affection vs. Evil/Good      0.77604 45245  0.62328  0.98904 2000
## Odds ratio: Food/Affection vs. No/Yes         0.14586 44452  0.11426  0.18982 2000
## Odds ratio: Food/Affection vs. No/Yes @ Evil  0.00848 31117  0.00527  0.01336 1299
## Odds ratio: Food/Affection vs. No/Yes @ Good  2.44193 35397  1.65204  3.63743  701
## Odds ratio: No/Yes vs. Evil/Good             13.12995 43500 10.58859 16.49207 2000
## Odds ratio: Yes/No vs. Evil/Good             0.07393 43739  0.05909  0.09221 2000
#
## The results indicate that evil cats are 13.13 times more likely than good cats to decline dancing
## Furthermore, when offered affection, evil cats are 104.20 times more likely to decline dancing,
## relative to evil cats that are offered food.

```

StatsRegression

Regression

Description

Simple, multiple and hierarchical regression

Usage

```

StatsRegression(
  y = NULL,
  y.names = NULL,
  x = NULL,
  x.names = NULL,
  x.steps = NULL,
  x.blocks = NULL,
  DF,
  params = NULL,
  job.group = NULL,
  initial.list = list(),

```

```
    ...
  )
```

Arguments

<code>y</code>	criterion variable(s), Default: NULL
<code>y.names</code>	optional names for criterion variable(s), Default: NULL
<code>x</code>	predictor variable(s), Default: NULL
<code>x.names</code>	optional names for predictor variable(s), Default: NULL
<code>x.steps</code>	define number of steps in hierarchical regression , Default: NULL
<code>x.blocks</code>	define which predictors are included in each step (e.g., for three steps "1,2,3") , Default: NULL
<code>DF</code>	data to analyze
<code>params</code>	define parameters to observe, Default: NULL
<code>job.group</code>	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
<code>initial.list</code>	initial values for analysis, Default: list()
<code>...</code>	further arguments passed to or from other methods

See Also

[complete.cases](#)

StatsSoftmax

Softmax Regression

Description

Perform softmax regression (i.e., multinomial logistic regression)

Usage

```
StatsSoftmax(
  y = NULL,
  y.names = NULL,
  x = NULL,
  x.names = NULL,
  DF,
  params = NULL,
  job.group = NULL,
  initial.list = NULL,
  run.robust = FALSE,
  ...
)
```

Arguments

y	criterion variable(s), Default: NULL
y.names	optional names for criterion variable(s), Default: NULL
x	predictor variable(s), Default: NULL
x.names	optional names for predictor variable(s), Default: NULL
DF	data to analyze
params	define parameters to observe, Default: NULL
job.group	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
initial.list	initial values for analysis, Default: list()
run.robust	logical, indicating whether or not robust analysis, Default: FALSE
...	further arguments passed to or from other methods

See Also

[complete.cases](#)

Examples

```
## Conduct softmax regression on Cats data
### Reward is 0 = Food and 1 = Dance
### Sample 100 datapoints from Cats data
#mcmc <- bfw(project.data = bfw::Cats,
#           y = "Alignment",
#           x = "Ratings,Reward",
#           saved.steps = 50000,
#           jags.model = "softmax",
#           jags.seed = 100)
## Conduct binominal generalized linear model
#model <- glm(Alignment ~ Ratings + Reward, data=bfw::Cats, family = binomial(link="logit"))
## Print output from softmax
#mcmc$summary.MCMC
#
##
##beta[1,1]: Evil vs. Ratings  0.000  0.00 -0.000607    0  0.000  0.000 2000
##beta[1,2]: Evil vs. Reward  0.000  0.00 -0.000607    0  0.000  0.000 2000
##beta[2,1]: Good vs. Ratings  1.289  1.29  1.283403 19614  1.187  1.387 2000
##beta[2,2]: Good vs. Reward  1.276  1.27  1.279209 20807  0.961  1.597 2000
##beta0[1]: Intercept: Evil   0.000  0.00 -0.000607    0  0.000  0.000 2000
##beta0[2]: Intercept: Good  -7.690 -7.68 -7.659198 17693 -8.472 -6.918 2000
##zbeta[1,1]: Evil vs. Ratings  0.000  0.00 -0.000607    0  0.000  0.000 2000
##zbeta[1,2]: Evil vs. Reward  0.000  0.00 -0.000607    0  0.000  0.000 2000
##zbeta[2,1]: Good vs. Ratings  2.476  2.47  2.464586 19614  2.280  2.664 2000
##zbeta[2,2]: Good vs. Reward  0.501  0.50  0.501960 20807  0.377  0.626 2000
##zbeta0[1]: Intercept: Evil   0.000  0.00 -0.000607    0  0.000  0.000 2000
##zbeta0[2]: Intercept: Good  -1.031 -1.03 -1.024178 22812 -1.185 -0.870 2000
#
## Print (truncated) output from GML
```

##	Estimate	Std. Error	z value	Pr(> z)
##(Intercept)	-6.39328	0.27255	-23.457	< 2e-16 ***
##Ratings	1.28480	0.05136	25.014	< 2e-16 ***
##RewardAffection	1.26975	0.16381	7.751	9.1e-15 ***

SumMCMC

*Summarize MCMC***Description**

The function provide a summary of each parameter of interest (mean, median, mode, effective sample size (ESS), HDI and n)

Usage

```
SumMCMC(
  par,
  par.names,
  job.names = NULL,
  job.group = NULL,
  credible.region = 0.95,
  ROPE = NULL,
  n.data,
  ...
)
```

Arguments

par	defined parameter
par.names	parameter names
job.names	names of all parameters in analysis, Default: NULL
job.group	for some hierarchical models with several layers of parameter names (e.g., latent and observed parameters), Default: NULL
credible.region	summarize uncertainty by defining a region of most credible values (e.g., 95 percent of the distribution), Default: 0.95
ROPE	define range for region of practical equivalence (e.g., c(-0.05 , 0.05), Default: NULL
n.data	sample size for each parameter
...	further arguments passed to or from other methods

See Also

[effectiveSize](#)

SumToZero

Sum to Zero

Description

Compute sum to zero values across all levels of a data matrix

Usage

```
SumToZero(q.levels, data, contrasts)
```

Arguments

q.levels	number of levels of each variable/column
data	data matrix to combine from
contrasts	specified contrasts columns

Examples

```
data <- matrix(c(1,2),ncol=2)
colnames(data) <- c("m1[1]","m1[2]")
SumToZero( 2 , data , contrasts = NULL )
#           b0[1] b1[1] b1[2]
# m1[1]  1.5 -0.5  0.5
```

TidyCode

Tidy Code

Description

Small function that clears up messy code

Usage

```
TidyCode(tidy.code, jags = TRUE)
```

Arguments

tidy.code	Messy code that needs cleaning
jags	logical, if TRUE run code as JAGS model, Default: TRUE

Value

(Somewhat) tidy code

Examples

```

messy <- "code <- function( x ) {
print ( x ) }"
cat(messy)
code <- function( x ) {
print ( x ) }
cat ( TidyCode(messy, jags = FALSE) )
code <- function(x) {
  print(x)
}

```

*Trim**Trim*

Description

remove excess whitespace from string

Usage

```
Trim(s, multi = TRUE)
```

Arguments

s	string
multi	logical, indicating whether or not to remove excess whitespace between characters, Default: TRUE

Examples

```

Trim("      Trimmed      string")
# [1] "Trimmed string"
Trim("      Trimmed      string", FALSE)
# [1] "Trimmed      string"

```

*TrimSplit**Trim Split*

Description

Extends strsplit by trimming and unlisting string

Usage

```
TrimSplit(
  x,
  sep = ",",
  fixed = FALSE,
  perl = FALSE,
  useBytes = FALSE,
  rm.empty = TRUE
)
```

Arguments

x	string
sep	symbol to separate data (e.g., comma-delimited), Default: ','
fixed	logical, if TRUE match split exactly, otherwise use regular expressions. Has priority over perl, Default: FALSE
perl	logical, indicating whether or not to use Perl-compatible regexps, Default: FALSE
useBytes	logical, if TRUE the matching is done byte-by-byte rather than character-by-character, Default: FALSE
rm.empty	logical. indicating whether or not to remove empty elements, Default: TRUE

Details

[strsplit](#)

Examples

```
TrimSplit("Data 1, Data2, Data3")
# [1] "Data 1" "Data2" "Data3"
```

VectorSub

Pattern Matching and Replacement From Vectors

Description

extending gsub by matching pattern and replacement from two vectors

Usage

```
VectorSub(pattern, replacement, string)
```

Arguments

pattern	vector containing words to match
replacement	vector containing words to replace existing words.
string	string to replace from

Value

modified string with replaced values

Examples

```
pattern <- c("A","B","C")
replacement <- 1:3
string <- "A went to B went to C"
VectorSub(pattern,replacement,string)
# [1] "1 went to 2 went to 3"
```

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