Package 'miscFuncs'

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Title Miscellaneous Useful Functions Including LaTeX Tables, Kalman
Filtering and Development Tools

Type Package

LazyLoad yes

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Description Implementing various things including functions for LaTeX tables,
the Kalman filter, web scraping, development tools, relative risk and odds
ratio.

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R topics documented:

.onAttach   *.onAttach function*

Description

A function to print a welcome message on loading package

Usage

```
.onAttach(libname, pkgname)
```

Arguments

libname	libname argument
pkgname	pkgname argument

Value

...

bin	*bin function*

Description

A function to convert decimal to binary

Usage

```
bin(n)
```

Arguments

n	a non-negative integer

Value

the binary representation stored in a vector.

colour_legend	*colour_legend function*

Description

A function to

Usage

```
colour_legend(palette, suffix = "", dir = ".")
```

Arguments

palette	X
suffix	X
dir	X

Value

...

`cor_taylor`   *cor_taylor function*

Description

A function to compute Taylor's correlation coefficient ;-)

Usage

```
cor_taylor(X)
```

Arguments

X   a numeric matrix with number of rows bigger than the number of columns

Value

Taylor's correlation coefficient, a number between 0 and 1 expressing the amount of dependence between multiple variables.

`cospulse`   *cospulse function*

Description

A function to

Usage

```
cospulse(x, tau = pi)
```

Arguments

x   X

tau   pulse duration

Value

...

---

cosrsaw	*cosrsaw function*

Description

A function to

Usage

```
cosrsaw(x)
```

Arguments

x	X

Value

...

---

cossaw	*cossaw function*

Description

A function to

Usage

```
cossaw(x)
```

Arguments

x	X

Value

...

---

costri   *costri function*

Description

A function to

Usage

```
costri(x)
```

Arguments

x   X

Value

...

---

daynames   *daynames function*

Description

A function to

Usage

```
daynames()
```

Value

...

EKFadvance *EKFadvance function*

Description

A function to perform one iteration of ther EKF. Currently UNDER DEVELOPMENT.

Usage

```
EKFadvance(
  obs,
  oldmean,
  oldvar,
  phi,
  phi.arglist,
  psi,
  psi.arglist,
  W,
  V,
  loglik = FALSE,
  na.rm = FALSE
)
```

Arguments

obs	observations
oldmean	old mean
oldvar	old variance
phi	Function computing a Taylor Series approximation of the system equation. Can include higher (ie 2nd order and above) terms.
phi.arglist	arguments for function phi
psi	Function computing a Taylor Series approximation of the observation equation. Can include higher (ie 2nd order and above) terms.
psi.arglist	arguments for function psi
W	system noise matrix
V	observation noise matrix
loglik	whether or not to compute the pseudo-likelihood
na.rm	logical, whether or not to handle NAs. Defult is FALSE. Set to TRUE if there are any missing values in the observed data.

Value

list containing the new mean and variance, and if specified, the likelihood

---

generic   *generic function*

Description

A function to generate roxygen templates for generic funtions and associated methods.

Usage

```
generic(gen, methods = NULL, sp = 3, oname = "obj")
```

Arguments

gen	character string giving the name of an S3 generic.
methods	character vector: a list of methods for which to provide templates
sp	the amont of space to put in between functions
oname	name of the generic object

Value

roxygen text printed to the console.

---

genharmonic   *genharmonic function*

Description

A function to create harmonic terms ready for a harmonic regression model to be fitted.

Usage

```
genharmonic(
  df,
  tname,
  base,
  num,
  sinfun = sin,
  cosfun = cos,
  sname = "s",
  cname = "c",
  power = FALSE
)
```

Arguments

df	a data frame
tname	a character string, the name of the time variable. Note this variable will be converted using the function as.numeric
base	the period of the first harmonic e.g. for harmonics at the sub-weekly level, one might set base=7 if time is measured in days
num	the number of harmonic terms to return
sinfun	function to compute sin-like components in model. Default is sin, but alternatives include sintri, or any other periodic function defined on [0,2pi]
cosfun	function to compute sin-like components in model. Default is cos, but alternatives include costri, or any other periodic function defined on [0,2pi] offset to sinfun by pi/2
sname	the prefix of the sin terms, default 's' returns variables 's1', 's2', 's3' etc.
cname	the prefix of the cos terms, default 's' returns variables 's1', 's2', 's3' etc.
power	logical, if FALSE (the default) it will return the standard Fourier series with sub-harmonics at 1, 1/2, 1/3, 1/4 of the base periodicicy. If TRUE, a power series will be used instead, with harmonics 1, 1/2, 1/4, 1/8 etc. of the base frequency.

Value

a data frame with the time variable in numeric form and the harmonic components

---

genIntegratedharmonic *genIntegratedharmonic function*

Description

A function to generate basis vectors for integrated Fourier series.

Usage

```
genIntegratedharmonic(
  df,
  t1name,
  t2name,
  base,
  num,
  sname = "bcoef",
  cname = "acoef",
  power = FALSE
)
```

Arguments

df	a data frame containing a numeric time variable of interest
t1name	a character string, the name of the variable in df containing the start time of the intervals
t2name	a character string, the name of the variable in df containing the end time of the intervals
base	the fundamental period of the signal, e.g. if it repeats over 24 hours and time is measured in hours, then put 'base = 24'; if the period is 24 hours but time is measured in days, then use 'base = 1/7'
num	number of sin and cosine terms to compute
sname	character string, name for cosine terms in Fourier series (not integrated)
cname	character string, name for sine terms in Fourier series (not integrated)
power	legacy functionality, not used here

Details

If the non-integrated Fourier series is:

$$f(t) = \text{sum\_k } a\_k \sin(2 \text{ pi } k \text{ } t \text{ } / \text{ } P) + b\_k \cos(2 \text{ pi } k \text{ } t \text{ } / \text{ } P)$$

then
int_t1^t2 f(s) ds = sum_k a_k (base/(2 pi k))*(cos(2 pi k t1 / P) - cos(2 pi k t2 / P)) +
b_k (base/(2 pi k))*(sin(2 pi k t2 / P)-sin(2 pi k t1 / P))
where P is the funcamental period, or 'base', as referred to in the function arguments

Value

a data frame containing the start and end time vectors, together with the sin and cosine terms

---

getstrbetween	*getstrbetween function*

Description

A function used in web scraping. Used to simplify the searching of HTML strings for information.

Usage

```
getstrbetween(linedata, start, startmark, endmark, include = FALSE)
```

Arguments

linedata	a string
start	integer, where to start looking in linedata
startmark	character string. a pattern identifying the start mark
endmark	character string. a pattern identifying the end mark
include	include the start and end marks?

Value

the first string after start and between the start and end marks

---

getwikicoords *getwikicoords function*

Description

A function to return the lat/lon coordinates of towns in the UK from Wikipedia. Does not always work. Sometimes the county has to be specified too.

Usage

```
getwikicoords(place, county = NULL, rmslash = TRUE)
```

Arguments

place	character, ther name of the town
county	character, the county it is in
rmslash	remove slash from place name. Not normally used.

Value

The lat/lon coordinates from Wikipedia

KFadvance *KFadvance function*

Description

A function to compute one step of the Kalman filter. Embed in a loop to run the filter on a set of data.

Usage

```
KFadvance(
  obs,
  oldmean,
  oldvar,
  A,
  B,
  C,
  D,
  E,
  F,
```

```
    W,
    V,
    marglik = FALSE,
    log = TRUE,
    na.rm = FALSE
)
```

Arguments

`obs`	Y_t
`oldmean`	mu_t-1
`oldvar`	Sigma_t-1
`A`	matrix A
`B`	column vector B
`C`	matrix C
`D`	matrix D
`E`	column vector E
`F`	matrix F
`W`	state noise covariance
`V`	observation noise covariance
`marglik`	logical, whether to return the marginal likelihood contribution from this observation
`log`	whether or not to return the log of the likelihood contribution.
`na.rm`	na.rm logical, whether or not to handle NAs. Defult is FALSE. Set to TRUE if there are any missing values in the observed data.

Details

The model is: (note that Y and theta are COLUMN VECTORS)

theta_t = A*theta_t-1 + B + C*W (state equation)

Y_t = D*theta_t + E + F*V (observation equation)

W and V are the covariance matrices of the state and observation noise. Prior is normal,

N(mu_t-1,Sigma_t-1)

Result is the posterior, N(mu_t,Sigma_t), together with the likelihood contribution Prob(Y_t|Y_t-1)

Value

list containing the new mean and variance, and if specified, the likelihood

***

KFadvanceAR2 *KFadvanceAR2 function*

***

Description

A function to compute one step of the Kalman filter with second order AR state evolution. Embed in a loop to run the filter on a set of data.

Usage

```
KFadvanceAR2(
  obs,
  oldmean,
  oldermean,
  oldvar,
  oldervar,
  A,
  A1,
  B,
  C,
  D,
  E,
  F,
  W,
  V,
  marglik = FALSE,
  log = TRUE,
  na.rm = FALSE
)
```

Arguments

obs	Y_t
oldmean	mu_t-1
oldermean	mu_t2
oldvar	Sigma_t-1
oldervar	Sigma_t-2
A	A matrix A
A1	A matrix A1
B	column vector B
C	matrix C
D	matrix D
E	column vector E
F	matrix F

W	state noise covariance
V	observation noise covariance
marglik	logical, whether to return the marginal likelihood contribution from this observation
log	whether or not to return the log of the likelihood contribution.
na.rm	na.rm logical, whether or not to handle NAs. Defult is FALSE. Set to TRUE if there are any missing values in the observed data.

Details

The model is: (note that Y and theta are COLUMN VECTORS)

theta_t = A*theta_t-1 + A1*theta_t-2 + B + C*W (state equation)

Y_t = D*theta_t + E + F*V (observation equation)

W and V are the covariance matrices of the state and observation noise. Priors are normal,

N(mu_t-1,Sigma_t-1) and N(mu_t-2,Sigma_t-2)

Result is the posterior, N(mu_t,Sigma_t), together with the likelihood contribution Prob(Y_t|Y_t-1)

Value

list containing the new mean and variance, and if specified, the likelihood

---

KFtemplates	*KFtemplates function*

Description

A function to print KFfit and KFparest templates to the console. See vignette("miscFuncs") for more information

Usage

```
KFtemplates()
```

Value

Tust prints to the console. This can be copied and pasted into a text editor for further manipulation.

```
latexformat                    latexformat function
```

Description

A function to format text or numeric variables using scientific notation for LaTeX documents.

Usage

```
latexformat(x, digits = 3, scientific = -3, ...)
```

Arguments

x	a numeric, or character
digits	see ?format
scientific	see ?format
...	other arguments to pass to the function format

Value

...

```
latextable                    latextable function
```

Description

A very useful function to create a LaTeX table from a matrix. Rounds numeric entries and also replaces small numbers with standard index form equivalents.

Usage

```
latextable(
  x,
  digits = 3,
  scientific = -3,
  colnames = NULL,
  rownames = NULL,
  caption = NULL,
  narep = " ",
  laststr = "",
  intable = TRUE,
  manualalign = NULL,
  file = "",
  ...
)
```

Arguments

x	a matrix, or object that can be coerced to a matrix. x can include mixed character and numeric entries.
digits	see help file for format
scientific	see help file for format
colnames	optional column names set to NULL (default) to automatically use column names of x. NOTE! if rownames is not NULL present, colnames must include an entry for the rownames i.e. it should be a vector of length the number of columns of x plus 1.
rownames	optional row names set to NULL (default) to automatically use row names of x
caption	optional caption, not normally used
narep	string giving replacement for NA entries in the matrix
laststr	string to write at end, eg note the double backslash!!
intable	output in a table environment?
manualalign	manual align string e.g. 'ccc' or 'llccc'
file	connection to write to, default is '' which writes to the console; see ?write for further details
...	additional arguments passed to format

Details

To get a backslash to appear, use a double backslash

Just copy and paste the results into your LaTeX document.

Value

prints the LaTeX table to screen, so it can be copied into reports

Examples

```
latextable(as.data.frame(matrix(1:4,2,2)))
```

---

method	*method function*

Description

A function to generate a roxygen template for a method of a generic S3 function. Normally, this would be called from the function generic, see ?generic

Usage

```
method(meth, gen, oname = "obj")
```

Arguments

meth	character, the name of the method
gen	character the associated generic method
oname	name of object

Value

a roxygen template for the method.

---

monthnames	*monthnames function*

Description

A function to

Usage

```
monthnames()
```

Value

...

---

print22	*print22 function*

Description

A function to print details of the 2 by 2 table for use with the function twotwoinfo.

Usage

```
print22()
```

Value

prints the names of the arguments of twotwofunction info to screen in their correct place in the 2 by 2 table

See Also

twotwoinfo

---

roxbc   *roxbc function*

Description

A function to build and check packages where documentation has been compiled with roxygen. Probably only works in Linux.

Usage

```
roxbc(name, checkflags = "--as-cran")
```

Arguments

name   package name

checkflags   string giving optional check flags to R CMD check, default is –as-cran

Value

builds and checks the package

---

roxbuild   *roxbuild function*

Description

A function to build packages where documentation has been compiled with roxygen. Probably only works in Linux.

Usage

```
roxbuild(name)
```

Arguments

name   package name

Value

builds and checks the package

---

roxtext *roxtext function*

Description

A function to generate roxygen documentation templates for functions for example,

Usage

```
roxtext(fname)
```

Arguments

fname   the name of a function as a character string or as a direct reference to the function

Details

would generate a template for this function. Note that functions with default arguments that include quotes will throw up an error at the moment, just delete these bits from the string, and if shold work.

Value

minimal roxygen template

---

sinpulse *sinpulse function*

Description

A function to

Usage

```
sinpulse(x, tau = pi)
```

Arguments

x   X

tau   pulse duration

Value

...

---

sinrsaw   *sinrsaw function*

Description

A function to

Usage

```
sinrsaw(x)
```

Arguments

x   X

Value

...

---

sinsaw   *sinsaw function*

Description

A function to

Usage

```
sinsaw(x)
```

Arguments

x   X

Value

...

---

sintri *sintri function*

Description

A function to

Usage

```
sintri(x)
```

Arguments

x   X

Value

...

---

timeop *timeop function*

Description

A function to time an operation in R

Usage

```
timeop(expr)
```

Arguments

expr   an expression to evaluate

Value

The time it took to evaluate the expression in seconds

---

twotwoinfo   *twotwoinfo function*

Description

A function to compute and diplay information about 2 by 2 tables for copying into LaTeX docu-
ments. Computes odds ratios and relative risks together with confidence intervals for 2 by 2 table
and prints to screen in LaTeX format. The funciton will try to fill in any missing values from the 2
by 2 table. Type print22() at the console to see what each argument refers to.

Usage

```
twotwoinfo(
  e1 = NA,
  u1 = NA,
  o1t = NA,
  e2 = NA,
  u2 = NA,
  o2t = NA,
  et = NA,
  ut = NA,
  T = NA,
  lev = 0.95,
  LaTeX = TRUE,
  digits = 3,
  scientific = -3,
  ...
)
```

Arguments

e1	type print22() at the console
u1	type print22() at the console
o1t	type print22() at the console
e2	type print22() at the console
u2	type print22() at the console
o2t	type print22() at the console
et	type print22() at the console
ut	type print22() at the console
T	type print22() at the console
lev	significance level for confidence intervals. Default is 0.95
LaTeX	whether to print the 2 by 2 information as LaTeX text to the screen, including the table, odds ratio, relative risk and confidence intervals
digits	see ?format

scientific	see ?format
...	other arguments passed to function format

Value

Computes odds ratios and relative risks together with confidence intervals for 2 by 2 table and prints to screen in LaTeX format.

See Also

[print22](#)

---

vdc	*vdc function*

Description

A function to generate a Van der Corput sequence of numbers.

Usage

```
vdc(n)
```

Arguments

n	the length of the sequence

Value

Van der Corput sequence of length n

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