Package ‘miscFuncs’

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License  GPL-3
Title  Miscellaneous Useful Functions Including LaTeX Tables, Kalman Filtering and Development Tools
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Author  Benjamin M. Taylor
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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### 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.

---

### EKFAdvance function

**Description**

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

**Usage**

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

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

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 functions and associated methods.

Usage

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

Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>gen</td>
<td>character string giving the name of an S3 generic.</td>
</tr>
<tr>
<td>methods</td>
<td>character vector: a list of methods for which to provide templates</td>
</tr>
<tr>
<td>sp</td>
<td>the amount of space to put in between functions</td>
</tr>
<tr>
<td>oname</td>
<td>name of the generic object</td>
</tr>
</tbody>
</table>

Value

roxygen text printed to the console.
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 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, the 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** logical, whether or not to handle NAs. Default 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)

\[
\begin{align*}
\theta_t &= A \theta_{t-1} + B + C W \\
Y_t &= D \theta_t + E + F V
\end{align*}
\]

\(W\) 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 \(\text{Prob}(Y_t|Y_{t-1})\)

**Value**

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


**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. Default 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)

\[ \theta_t = A*\theta_t\_t-1 + A1*\theta_t\_t-2 + B + C*W \] (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)
**KFtemplates**

**Value**

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

---

**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**

...
**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**

```r
latexable(x, digits = 3, scientific = -3, colnames = NULL,
rownames = NULL, caption = NULL, narep = "", laststr = "", ...)  
```

**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!!
- `...` 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**

```r
latexable(as.data.frame(matrix(1:4,2,2)))
```
method

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.

print22

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** **function**

**Description**

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

**Usage**

```r
grobx::roxbc(nameL 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** **function**

**Description**

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

**Usage**

```r
grobx::roxbuild(name)
```

**Arguments**

- `name` package name

**Value**

builds and checks the package
**rotext**

---

**rotext function**

**Description**

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

**Usage**

rotext(s)

**Arguments**

s a string enclosed in quotes

**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 it should work.

**Value**

minimal roxygen template

---

**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 function

**Description**

A function to compute and display information about 2 by 2 tables for copying into LaTeX documents. Computes odds ratios and relative risks together with confidence intervals for 2 by 2 table and prints to screen in LaTeX format. The function 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**

```r
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`
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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