Package 'brixtools'

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Type Package

Title Some statistical methods for non-life insurance

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Author Kristoffer Brix

Maintainer Kristoffer Brix <kbrix@protonmail.com>

Description
Implementation of some statistical methods for non-life insurance taking deductibles into account.

Depends R (>= 2.10)

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 6.0.1

Suggests testthat, knitr, rmarkdown

URL https://github.com/kbrix/brixtools

BugReports https://github.com/kbrix/brixtools/issues

VignetteBuilder knitr

R topics documented:

`brix_simple` *Simple optimizer*

Description

A simple optimizer for log-likelihoods or other functions.

Usage

```
brix_simple(optimizer, fn, ...)
```

Arguments

`optimizer`	recommended choice is `optim`.
`fn`	function to be optimized.
`...`	additional arguments passed to the `optimizer`, see `examples`.

Details

The optimizer must always be specified first. The function to be optimized must always be specified second. See e.g. `optim` for the optimizer.

Value

Returns an object of `class` "brix_simple". The function `summary` can also be used to print a summary of the model.

An object of class "brix" is a list containing at the function call and the results from the optimizer. The optimal parameters are named if applicable. The summary contains at least the following components:

`call`	the function call.
`coefficients`	the optimal coefficents.
`value`	the optimal value of the log-likelihood function.
`AIC`	the AIC of the log-likelihood.

Examples

```
# Using optim for optimization
model <- brix_simple(optimizer = optim,
                     # function to be optimized
                     fn = normal_poisson_log_likelihood,
                     # arguments passed to fn
                     X = normal_poisson_x, N = normal_poisson_n,
                     # additional arguments passed to optim
                     par = rep(1, 3),
                     control = list(fnscale = -1),
                     method = "Nelder-Mead",
```

```
                      hessian = TRUE)
model
summary(model)
```

`normal_poisson_log_likelihood` *Normal-Poisson log-likelihood*

Description

Implementation of Normal-Poisson log-likelihood, taking deductibles into account.

Usage

```
normal_poisson_log_likelihood(parameter = NULL, X = NULL, N = NULL,
  check = 1)
```

Arguments

`parameter`	`numeric`, vector of parameters of length 3 consisting of the mean and standard deviation of the Normal component and the mean of the Poisson component. Default is `NULL`.
`X`	`data.frame`, must have two columns named `claim` and `deductible` for the Normal component of the log-likelihood. Default is `NULL`.
`N`	`data.frame`, must have two columns `occurrence` and `deductible` for the Poisson component of the log-likelihood. Default is `NULL`.
`check`	default value is 1 and returns the log-likelihood, else returns the parameter names of the model: `mean`, `sd` and `lambda`.

Details

Note that the row number of `X` and `N` need not be the same.

Value

Returns a `numeric` value or `character` vector of parameter names depending on whether `check = 1` or not.

Examples

```
normal_poisson_log_likelihood(c(1,2,3), X = normal_poisson_x, N = normal_poisson_n, check = 1)
normal_poisson_log_likelihood(c(1,2,3), X = normal_poisson_x, N = normal_poisson_n, check = 0)
normal_poisson_log_likelihood(check = 0)
```

`normal_poisson_policy` *Normal-Poisson policy data*

Description

Simulated Normal-Poisson policy data for testing and demostration purposes.

Usage

```
normal_poisson_policy

normal_poisson_n

normal_poisson_x
```

Format

The object `normal_poisson_policy` is a `list` with $m = 10000$ policies. Each policy consists of the following:

deductible Sample of standard Normal random variable of length 1.

occurrence Sample of Poisson distributed random varible of length 1 with mean 1.

loss Sample of Normal distributed random variable of length `occurrence`, with mean 1.5 and standard deviation 1.5. Returns `numeric(0)` if `occurrence` is 0.

claim The `loss` given that it is larger than the `deductible`. Returns `numeric(0)` if `occurrence` is zero or if all losses are smaller than the `deductible`.

reported Length of `claim`. Returns zero if `claim` is `numeric(0)`.

The object `normal_poisson_n` is a `data.frame` with 10000 rows (policies) and 3 columns consisting of `occurrence`, `deductible` and `length`.

The object `normal_poisson_x` is a `data.frame` with `sum(normal_poisson_n$length)` rows and 2 columns consisting of `claim` and `deductible`.

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