Package 'extendedFamily'

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Type Package

Title Additional Families for Generalized Linear Models

Version 0.2.4

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Description Creates family objects identical to stats
family but for new links.

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.2.3

Suggests testthat, covr, numDeriv (>= 2016.8-1)

Imports stats (>= 3.5.3), assertthat (>= 0.2.1)

Depends R (>= 3.5.0)

NeedsCompilation no

Repository CRAN

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R topics documented:

| `binomialEF` | *Additional Binomial Links For Generalized Linear Models* |

Description

Additional Binomial Links For Generalized Linear Models

Usage

```
binomialEF(link = "loglog", alpha = 1)
```

Arguments

`link`	name of link function. One of loglog, logc, identity, or odds-power (Default: loglog)
`alpha`	power for odds-power link. Not used otherwise. (Default: 1)

Details

family is a generic function with methods for classes "glm" and "lm".

The loglog link works well for many datasets. The range of the link is negative infinity to positive infinity. For all other links, this is not true. This can cause a failure to converge in R's glm function. If this happens, the link does not work well for the training data. Try another link.

Value

An object of class "family" (which has a concise print method). This is a list with elements

- family: character: the family name.
- link: character: the link name.
- linkfun: function: the link.
- linkinv: function: the inverse of the link function.
- variance: function: the variance as a function of the mean.
- dev.resids function giving the deviance for each observation as a function of (y, mu, wt), used by the residuals method when computing deviance residuals.
- aic: function giving the AIC value if appropriate (but NA for the quasi- families). More precisely, this function returns -2 ll + 2 s, where ll is the log-likelihood and s is the number of estimated scale parameters. Note that the penalty term for the location parameters (typically the "regression coefficients") is added elsewhere, e.g., in glm.fit() or AIC(), see the AIC example in glm. See logLik for the assumptions made about the dispersion parameter.
- initialize: expression. This needs to set up whatever data objects are needed for the family as well as n (needed for AIC in the binomial family) and mustart (See glm)
- validmu: logical function. Returns TRUE if a mean vector mu is within the domain of variance.

- valideta: logical function. Returns TRUE if a linear predictor eta is within the domain of linkinv.
- simulate: (optional) function simulate(object, nsim) to be called by the "lm" method of simulate. It will normally return a matrix with nsim columns and one row for each fitted value, but it can also return a list of length nsim. Clearly this will be missing for 'quasi-' families.
- dispersion: (optional for R >= 4.3.0) numeric: value of the dispersion parameter, if fixed, or NA_real_ if free.

Examples

```
library(stats)
library(extendedFamily)

# loglog example
data(heart)
model <- glm(
  formula = death ~ anterior + hcabg +
    kk2 + kk3 + kk4 + age2 + age3 + age4,
  data = heart,
  family = binomialEF(link = "loglog")
)
```

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heart   *Heart Attack Data*

Description

A dataset containing 4,483 rows about heart attack victims.

Usage

```
data(heart)
```

Format

A data frame with 4,483 rows and 11 variables:

death 1 - Death within 48 hours of myocardial infarction onset. 0 - otherwise.

anterior 1 - anterior infarction. 0 - inferior infarction

hcabg 1 - Medical history of cardiac bypass surgery. 0 - otherwise

kk1 1 - Killip class 1. 0 - otherwise

kk2 1 - Killip class 2. 0 - otherwise

kk3 1 - Killip class 3. 0 - otherwise

kk4 1 - Killip class 4. 0 - otherwise

age1 1 - Patient age less than 60. 0 - otherwise

age2 1 - Patient age between 60 and 69 inclusive. 0 - otherwise

age3 1 - Patient age between 70 and 79 inclusive. 0 - otherwise

age4 1 - Patient age 80 or higher. 0 - otherwise

Details

The raw dataset is minimally modified in this package. Rows containing missing values were removed. The center variable was dropped. This data is referred to as "heart01" in Generalized Linear Models and Extensions book.

Source

Hardin, James William., and Joseph Hilbe. Generalized Linear Models and Extensions. Stata Press, 2012.

Dataset can be downloaded at <https://www.stata-press.com/data/glmext.html>

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