Package ‘nmixgof’

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Title  Goodness of Fit Checks for Binomial N-Mixture Models
Version  0.1.0
Description  Provides residuals and overdispersion metrics to assess the fit of N-
mixture models obtained using the package 'unmarked'.
Details on the methods are given in Knape et al. (2017) <doi:10.1101/194340>.
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Description
Computes various types of overdispersion metrics, based on Pearson residuals, for binomial N-
mixture models.

Usage
```
chat(umfitL type = "marginal")
```

Arguments
- `umfit`: An object of class `unmarkedFit` from a model fitted using `pcount`.
- `type`: The type of metric to compute, one of 'marginal', 'site-sum' or 'observation'.

Value
An estimate of overdispersion relative to the fitted model.

Examples
```
library(unmarked)
data(mallard)
fm.mallard <- pcount(~ 1 ~ 1L unmarkedFramePCount(y = mallard.y), K=100)
chat(fm.mallard, "m")
chat(fm.mallard, "s")
chat(fm.mallard, "o")
```

nmixgof

Goodness of fit checks for binomial N-mixture models

Description
The package contains methods to compute overdispersion metrics, randomized quantile residuals,
and graphical diagnostics of model fit for binomial N-mixture models fitted using the `unmarked`
package. Details about the checks are given in Knape et al. (2018) and at
https://www.biorxiv.org/content/early/2017/09/27/194340.

References
Knape et al. 2018. Sensitivity of binomial N-mixture models to overdispersion: the importance of
residcov  

Plot residuals against covariates

Description

A convenience function to plot rq residuals against all untransformed numeric covariates. Site-sum randomized quantile residuals are used for site covariates while marginal residuals are used for observation covariates. The same random residual draws are reused for different covariates.

Usage

residcov(umFit, ...)

Arguments

umFit  An object of class unmarkedFit from a model fitted using pcount.
...
Plot arguments.

Examples

library(unmarked)
umf = unmarkedFramePCount(y = shoveler$y, obsCovs = shoveler$obs, siteCovs = shoveler$site)
fmp = pcount(~scale(date) + scale(reedcover) ~ scale(log(water)) + scale(latitude),
   data = umf, K = 80)
residcov(fmp)

residfit  

Plot residuals against fitted values

Description

Plots randomized-quantile residuals for binomial N-mixture models against fitted values.

Usage

residfit(umFit, type = "marginal", ...)

Arguments

umFit  An object from a model fitted using pcount.
type  The type of randomized quantile residual to plot. One of 'marginal', 'site-sum' or 'observation'.
...
Plot arguments.
Examples

library(unmarked)
umf = unmarkedFramePCount(y = shoveler$y, obsCovs = shoveler$obs, siteCovs = shoveler$site)
fmp = pcount(~scale(date) + scale(reedcover) ~ scale(log(water)) + scale(latitude),
              data = umf, K = 80)
residfit(fmp, "marginal")
residfit(fmp, "site-sum")
residfit(fmp, "observation")

residqq Qq plot of randomized quantile residuals against standard normal quantiles

Description

Qq plot of randomized quantile residuals against standard normal quantiles

Usage

residqq(umfit, type = "site-sum", main = "Residual qq plot",
        plotLine = TRUE, ...)

Arguments

umFit An object of class unmarkedFit from a model fitted using pcount.
type The type of randomized quantile residual to plot. One of 'site-sum' or 'observation'.
main Plot label.
plotLine If true, the identity line is added to the plot.
...

Further arguments passed to qqnorm.

Value

A list with x and y coordinates of the qq plot, see qqnorm.

Examples

library(unmarked)
umf = unmarkedFramePCount(y = shoveler$y, obsCovs = shoveler$obs, siteCovs = shoveler$site)
fmp = pcount(~scale(date) + scale(reedcover) ~ scale(log(water)) + scale(latitude),
            data = umf, K = 80)
residqq(fmp, "site-sum")
residqq(fmp, "observation")
**rqresiduals**

*Randomized quantile residuals for binomial N-mixture models.*

**Description**

Computes three types of randomized quantile residuals for binomial N-mixture models.

**Usage**

```r
rqresiduals(umfit, type = "marginal")
```

**Arguments**

- `umfit` An object of class `unmarkedFit` from a model fitted using `pcount`.
- `type` The type of rq residuals to compute, one of 'marginal', 'site-sum' or 'observation'.

**Value**

A matrix (if type is 'marginal' or 'site-sum') or vector (for observation).

**Examples**

```r
library(unmarked)
umf = unmarkedFramePCount(y = shoveler$y, obsCovs = shoveler$obs, siteCovs = shoveler$site)
fmp = pcount(~ scale(date) + scale(reedcover) ~ scale(log(water)) + scale(latitude), data = umf, K = 80)
qqnorm(rqresiduals(fmp, "s"))
qqnorm(rqresiduals(fmp, "o"))
par(mfcol = c(3,4))
invisible(apply(rqresiduals(fmp, "m"), 2, qqnorm))
```

**shoveler**

*Northern shoveler data*

**Description**

Repeated count data of Northern shoveler with covariates, formatted for use with the unmarked package.

**Usage**

```r
shoveler
```
Format

A list with three elements

- **y** A matrix with Northern shoveler counts
- **site** A data frame with site specific covariates
- **obs** A list containing observation specific covariates

References


Examples

```r
library(unmarked)
unf = unmarkedFramePCount(y = shoveler$y, obsCovs = shoveler$obs, siteCovs = shoveler$site)
```
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