Package: regcorr (via r-universe)

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Type Package

Title Models of Pearson Correlation Coefficient

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Author Ze Lin, Bo Li, Jinyao Shen

Maintainer Ze Lin <zlin5858@163.com>

Description Implements regression models to assess the effect of covariates on the Pearson correlation coefficient for both bivariate normal and bivariate binary responses. This package provides likelihood-based inference using Newton-Raphson estimation and bootstrap-based methods for significance testing, featuring built-in robust handling for numerical instabilities in extreme samples.

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Contents

genDataBB *Generate data from bivariate Bernoulli*

Description

Generate data from bivariate Bernoulli

Usage

```
genDataBB(numSample, p, betaTrue, eta1True, eta2True, link)
```

Arguments

numSample	Sample size.
p	Number of covariates.
betaTrue	True beta vector.
eta1True	True eta1 vector.
eta2True	True eta2 vector.
link	Link function indicator ("1" = logistic; "2" = tanh).

Value

A list containing X, Y, and rho.

genDataBN *Generate data from bivariate normal*

Description

Generate data from bivariate normal

Usage

```
genDataBN(numSample, p, betaTrue, eta1True, eta2True, link)
```

Arguments

numSample	Sample size.
p	Number of covariates.
betaTrue	True beta vector.
eta1True	True eta1 vector.
eta2True	True eta2 vector.
link	Link function indicator ("1" = logistic; "2" = tanh).

Value

A list containing X, Y, and rho.

`logistic` *Logistic function*

Description

Logistic function

Usage

```
logistic(x)
```

Arguments

`x`	A numeric vector.

Value

The calculated logistic probability.

`NRfitBivBernoulli` *Estimate beta for Bivariate Bernoulli responses using Newton Raphson*

Description

Estimate beta for Bivariate Bernoulli responses using Newton Raphson

Usage

```
NRfitBivBernoulli(Y, X, beta0, link)
```

Arguments

`Y`	n by 2 matrix, paired responses.
`X`	n by p matrix, covariate matrix including first column of ones.
`beta0`	Initial estimate of beta.
`link`	Indicator of link function ("1" = logistic, "2" = tanh).

Value

A list containing betaCurrent, numIter, and restart.

NRfitBivNormal *Estimate beta for Bivariate Normal responses using Newton Raphson*

Description

Estimate beta for Bivariate Normal responses using Newton Raphson

Usage

```
NRfitBivNormal(Y, X, betaIni, link)
```

Arguments

Y	n by 2 matrix, paired responses.
X	n by p matrix, covariate matrix including first column of ones.
betaIni	Initial estimate of beta.
link	Indicator of link function ("1" = logistic, "2" = tanh).

Value

A list containing betaCurrent, numIter, and restart.

rbinary *Generate bivariate binary data*

Description

Generate bivariate binary data

Usage

```
rbinary(n, p, rho)
```

Arguments

n	Number of rows.
p	1 by 2 mean vector of bivariate variables.
rho	Correlation of bivariate variables.

Value

n by 2 matrix of generated binary variables.

`subRoutineTest` *Subroutine to test the significance of individual parameters*

Description

Subroutine to test the significance of individual parameters

Usage

```
subRoutineTest(
  numSample,
  p,
  link,
  model,
  betaTrue,
  betaIni,
  eta1True,
  eta2True,
  numSimu,
  numBoot
)
```

Arguments

`numSample`	Sample size.
`p`	Number of covariates.
`link`	Link function.
`model`	Model type (1: biv normal; 2: biv Bernoulli).
`betaTrue`	True beta.
`betaIni`	Initial beta.
`eta1True`	True eta1.
`eta2True`	True eta2.
`numSimu`	Number of simulations.
`numBoot`	Number of bootstrap iterations.

Value

A list containing RMSE, ConsistRate, and testing power.

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