Package: robustETM (via r-universe)

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Type Package

Title Robust Methods using Exponential Tilt Model

Version 1.0

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Imports stats

Description Testing homogeneity for generalized exponential tilt model. This package includes a collection of functions for (1) implementing methods for testing homogeneity for generalized exponential tilt model; and (2) implementing existing methods under comparison.

Depends R (>= 2.5.0)

License GPL (>= 2)

LazyLoad no

NeedsCompilation yes

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Repository https://chuanhong.r-universe.dev

RemoteUrl https://github.com/cran/robustETM

RemoteRef HEAD

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Contents

robustETM-package *Robust Exponential Tilt Mixture Model*

Description

The package **robustETM** consists of the functions to perform pseudolikelihood based EM test for homogeneity in generalized exponential tilt mixture models.

Details

Package:	robustETM
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License:	GPL>=2

Testing for homogeneity in generalized exponential titl mixture model

Motivated by analyses of DNA methylation data, we propose a semiparametric mixture model, namely the generalized exponential tilt mixture model, to account for heterogeneity between differentially methylated and non-differentially methylated subjects in the cancer group, and capture the differences in higher order moments (e.g. mean and variance) between subjects in cancer and normal groups. A pairwise pseudolikelihood is constructed to eliminate the unknown nuisance function. To circumvent boundary and non-identifiability problems as in parametric mixture models, we modify the pseudolikelihood by adding a penalty function. In addition, test with simple asymptotic distribution has computational advantages over permutational test for high-dimensional genetic and epigenetic data. We propose a pseudolikelihood based expectation-maximization test, and show the proposed test follows a simple chi-squared limiting distribution.

The methods contains in function sim are:

- **The proposed PLEMT test (pseudolikelihood based EM test)**
- **The t-test**
- **The modified empirical likelihood ratio test**
- **The empirical likelihood ratio test**
- **The logistic regression test**
- **The Wilcoxon test**
- **The F test**
- **The KS test**

Author(s)

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References

Hong, C., Chen Y., Ning Y., Wang S., Wu H. and Carroll R.J. (2016). PLEMT: A novel pseudolikelihood based EM test for homogeneity in generalized exponential tilt mixture model (in preparation).

`sim` *Tests under comparision for testing for homogeneity in generalized exponential tilt mixture models*

Description

The function conducts the pseudolikelihood based EM test for homogeneity in generalized exponential tilt mixture models

Usage

```
sim(itr, K, cc, i.n, isetting, lambda, distn)
```

Arguments

`itr`	random seed
`K`	Number of grid values for proportion parameter lambda
`cc`	Tuning parameter C for penalty function
`isetting`	Type I error or power scenarios I II and III for simulation study
`lambda`	Proportion parameter lambda
`i.n`	Sample size setting
`distn`	Distribution

Value

`mplrt_EM.TS`	Test statistic for the proposed PLEMT test
`qin.TS`	Test statistic for empirical likelihood ratio test
`liu.TS`	Test statistic for modified empirical likelihood ratio test
`t.TS`	Test statistic for t-test
`wilcox.p`	p-value for wilcoxon test
`logist.TS`	Test statistic for logistic regression test

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References

Hong, C., Chen Y., Ning Y., Wang S., Wu H. and Carroll R.J. (2016). PLEMT: A novel pseudolikelihood based EM test for homogeneity in generalized exponential tilt mixture model (in preparation).

Examples

```
# not run
#myresult=sim(itr=1234, K=10, cc=20, i.n=2, isetting=1, lambda=0.3, distn="norm")
```

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