Package 'ExGaussEstim'

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Title Quantile Maximization Likelihood Estimation and Bayesian
Ex-Gaussian Estimation

Version 0.1.2

Description Presents two methods to estimate the parameters 'mu', 'sigma', and 'tau' of an ex-Gaussian distribution. Those methods are Quantile Maximization Likelihood Estimation ('QMLE') and Bayesian. The 'QMLE' method allows a choice between three different estimation algorithms for these parameters : 'neldermead' ('NEMD'), 'fminsearch' ('FMIN'), and 'nlminb' ('NLMI'). For more details about the methods you can refer at the following list: Brown, S., & Heathcote, A. (2003) <doi:10.3758/BF03195527>; McCormack, P. D., & Wright, N. M. (1964) <doi:10.1037/h0083285>; Van Zandt, T. (2000) <doi:10.3758/BF03214357>; El Haj, A ret, C. (2021) <doi:10.19139/soic-2310-5070-1251>; Gilks, W. R., Best, N. G., & Tan, K. K. C. (1995) <doi:10.2307/2986138>.

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Encoding UTF-8

LazyLoad true

RoxygenNote 7.2.3

Imports pracma, stats, nloptr, invgamma, dlm, fitdistrplus,
gamlss.dist

NeedsCompilation no

Suggests testthat (>= 3.0.0)

Config/testthat/edition 3

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R topics documented:

BayesianExgaussian   *Bayesian Ex-gaussian Estimate*

Description

Estimates the mu, sigma, and tau parameters of an ex-Gaussian distribution using a bayesian method.

Usage

```
BayesianExgaussian(n, x, nSamples = 5000, Ti = 2500)
```

Arguments

n	the data size
x	the data. Must be a vector, with no missing values
nSamples	number of Samples
Ti	burn-in

Value

BayesianExgaussian() returns an object "theta" which is a list with components: estimates of mu, sigma, and tau

References

Brown, S., & Heathcote, A. (2003). QMLE: Fast, robust, and efficient estimation of distribution functions based on quantiles. *Behavior Research Methods, Instruments, & Computers*, **35**, 485-492.

McCormack, P. D., & Wright, N. M. (1964). The positive skew observed in reaction time distributions. *Canadian Journal of Psychology/Revue canadienne de psychologie*, **18**, 43-51.

Van Zandt, T. (2000). How to fit a response time distribution. *Psychonomic Bulletin & Review*, **7**, 424-465.

El Haj, A., Slaoui, Y., Solier, C., & Perret, C. (2021). Bayesian Estimation of The Ex-Gaussian distribution. *Statistics, Optimization & Information Computing*, **9(4)**, 809-819.

Gilks, W. R., Best, N. G., & Tan, K. K. C. (1995). Adaptive rejection Metropolis sampling within Gibbs sampling. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, **44**, 455-472.

Examples

```
library(gamlss.dist)
set.seed(2703)
data<-rexGAUS(n=100, mu = 500, sigma = 150, nu = 100)
BayesianExgaussian(n = 100, x = data)
```

QMLEEstim *Ex-Gaussian Quantile Maximum Likelihood Estimate*

Description

Estimates the mu, sigma, and tau parameters of an ex-Gaussian distribution. 3 different algorithms can be used : neldermead ('NEMD'), fminsearch ('FMIN') and nlminb ('NLMI').

Usage

```
QMLEEstim(y, func)
```

Arguments

y	the data. Must be a vector with no missing values
func	the function selected for the estimation. 'NEMD' for neldermead, 'FMIN' for fminsearch, and 'NLMI' for nlminb.

Value

QMLEEstim() returns an object "valEstim" which is a list with components: estimates of mu, sigma, and tau

References

Brown, S., & Heathcote, A. (2003). QMLE: Fast, robust, and efficient estimation of distribution functions based on quantiles. *Behavior Research Methods, Instruments, & Computers*, **35**, 485-492.

McCormack, P. D., & Wright, N. M. (1964). The positive skew observed in reaction time distributions. *Canadian Journal of Psychology/Revue canadienne de psychologie*, **18**, 43-51.

Van Zandt, T. (2000). How to fit a response time distribution. *Psychonomic Bulletin & Review*, **7**, 424-465.

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Gilks, W. R., Best, N. G., & Tan, K. K. C. (1995). Adaptive rejection Metropolis sampling within Gibbs sampling. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, **44**, 455-472.

Examples

```
library(gamlss.dist)
set.seed(2703)
data<-rexGAUS(n=100, mu = 500, sigma = 150, nu = 100)
QMLEEstim(data, 'NEMD')
```

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