Package ‘ltmix’

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Type Package

Title Left-Truncated Mixtures of Gamma, Weibull, and Lognormal Distributions

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createLtmmObj  

Create an ltmm model object given data and parameters

Description

This function is useful for comparing models produced using the ltmix package to models fit using other, or for computing fit criteria and risk measures for a known set of parameters.

Usage

createLtmmObj(x, distributions, trunc, Pars, Pi, npars = NULL)

Arguments

x  
data vector

 distributes  
densities to combine

trunc  
left truncation point (optional)

Pars  
list of length G of parameter values

Pi  
vector of length G of component proportions

npars  
Can optionally be used to overwrite the number of free parameters (used in the calculation of AIC & BIC), if the model has additional constraints

Value

An ltmm model object

ltmix  

ltmix: Left-Truncated Mixtures of Gamma, Weibull, and Lognormal Distributions

Description

Mixture modelling of one-dimensional data using combinations of left-truncated Gamma, Weibull, and Lognormal Distributions.
fit a left-truncated mixture model (ltmm)

**Description**

This function generates a mixture model combining left-truncated lognormal, gamma, and weibull distributions.

**Usage**

```r
ltmm(x, G, distributions, trunc = NULL, EM_init_method = "emEM",
     EM_starts = 5, init_pars = NULL, init_pi = NULL,
     init_classes = NULL, one_group_reps = 50, eps = 1e-06,
     max.it = 1000, verbose = FALSE)
```

**Arguments**

- `x` data vector
- `G` number of components
- `distributions` densities to combine
- `trunc` left truncation point (optional)
- `EM_init_method` initialization method for EM algorithm
- `EM_starts` number of random starts for initialization of EM algorithm. (only for G > 1)
- `init_pars` initial parameter values (list of length G)
- `init_pi` manually specified initial component proportions (for init_method=specified)
- `init_classes` manually specified initial classes. will overwrite init_pars and init_pi
- `one_group_reps` number of random starts for each numerical optimization in 1-component model
- `eps` stopping tolerance for EM algorithm
- `max.it` maximum number of iterations of EM algorithm
- `verbose` print information as fitting progresses?

**Value**

An ltmm model object, with the following properties:

- `x` Copy of the input data
- `distributions` The selected distributions
- `trunc` The left truncation value, if specified
- `fitted_pdf` The probability density function of the fitted model
- `fitted_cfd` The cumulative density function of the fitted model
- `VaR` The value-at-risk of the fitted model (function with p taken as only argument)
- `ES` The expected shortfall of the fitted model (function with p taken as only argument)
ltmmCombo

Fit a Left-truncated mixture model (LTMM)

Description
This function fits a family of finite mixture models using every combination of the left-truncated lognormal, gamma, and weibull distributions.

Usage
ltmmCombo(x, G, distributions = c("lognormal", "gamma", "weibull"), trunc = NULL, EM_init_method = "emEM", EM_starts = 5, init_pars = NULL, init_pi = NULL, init_classes = NULL, one_group_reps = 50, eps = 1e-06, max.it = 1000, verbose = FALSE, parallel = FALSE, cores = NULL, save_each_fit = FALSE)

Arguments
- **x**: data vector
- **G**: number of components
- **distributions**: densities to combine
**ltmmCombo**

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<td>trunc</td>
<td>left truncation point (optional)</td>
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<tr>
<td>EM_init_method</td>
<td>initialization method for EM algorithm</td>
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<td>number of random starts for initialization of EM algorithm. (only for G &gt; 1)</td>
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<tr>
<td>init_pars</td>
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<td>init_pi</td>
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<td>init_classes</td>
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<td>number of random starts for each numerical optimization in 1-component model</td>
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<td>cores</td>
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<td>save_each_fit</td>
<td>save each model as it is produced, in a time-stamped directory (safer)</td>
</tr>
</tbody>
</table>

**Value**

An `ltmmCombo` model object, with the following properties:

- **x** Copy of the input data
- **distributions** The selected distributions
- **combos** List of all combinations of distributions considered
- **all.fits** List of all ltmm fit objects
- **all.bic** Vector of BIC values for each model
- **best.bic.fit** The best ltmm fit by BIC
- **best.bic** The best BIC value of all fits
- **best.bic.combo** The combination of distributions used for the best fit by BIC
- **all.aic** Vector of AIC value for each model
- **best.aic.fit** The best ltmm fit by AIC
- **best.aic** The best AIC value of all fits
- **best.aic.combo** The combination of distributions used for the best fit by AIC
- **all.ll** Vector of log-likelihood value for each model
- **summary_table** Table summarizing the AIC, BIC, LL, and risk measures for each fitted model

**References**


**Examples**

```r
x <- secura$Loss

fits_GL <- ltmmCombo(x, G = 2, distributions = c('gamma', 'lognormal'), trunc = 1.2e6)
summary(fits_GL)
```
Description

"The Secura Belgian Re data set contains automobile claims from 1988 until 2001, which are at least as large as 1,200,000 Euros." (Beirlant, Goegebeur, Segers & Teugels, 2004).

Usage

secura

Format

An object of class data.frame with 370 rows and 2 columns.

References

https://lstat.kuleuven.be/Wiley/
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