

Package ‘alpmixBayes’

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Type Package

Title Bayesian Estimation for Alpha-Mixture Survival Models

Version 0.1.0

Description Implements Bayesian estimation and inference for alpha-mixture survival models, including Weibull and Exponential based components, with tools for simulation and posterior summaries. The methods target applications in reliability and biomedical survival analysis. The package implements Bayesian estimation for the alpha-mixture methodology introduced in Asadi et al. (2019) <[doi:10.1017/jpr.2019.72](https://doi.org/10.1017/jpr.2019.72)>.

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Imports MCMCpack, stats, utils, gtools

License GPL-3

Encoding UTF-8

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LazyData true

LazyDataCompression xz

Suggests testthat (>= 3.0.0)

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Contents

alpmixBayes	2
demo_run	3
ew	3

ewg	4
ewgmix	4
ewmix	5
ll	5
llmix	6
summary.alpmixBayes	6
ww	7
wwmix	7

Index	8
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alpmixBayes	<i>Main Bayesian Mixture Model Function</i>
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Description

Main Bayesian Mixture Model Function

Usage

```
alpmixBayes(
  d,
  mcmc_values = NULL,
  init_values = NULL,
  prior = NULL,
  survmodel = c("WW", "EW", "LL", "EWG"),
  verbose = TRUE,
  ...
)
```

Arguments

d	Input data
mcmc_values	MCMC parameters
init_values	Initial values
prior	Prior distributions
survmodel	Survival model type
verbose	Logical. If TRUE, progress messages are printed. Default is TRUE.
...	Additional arguments

Value

Bayesian mixture model results

demo_run	<i>Run a demo of alpmixBayes</i>
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Description

This runs alpmixBayes on the packaged example dataset ewm1.100.

Usage

```
demo_run(verbose = TRUE)
```

Arguments

verbose Logical. If TRUE, progress messages are printed. Default is TRUE.

Value

Summary of the Bayesian mixture model

Examples

```
# Run the demo (may take a few moments)
demo_run()
```

ew	<i>EW Mixture Model Dataset</i>
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Description

Demonstration dataset for Exponential-Weibull mixture models. Contains 5 simulated datasets for examples and testing.

Usage

```
ew
```

Format

A list with 5 components, each containing mixture model data

Source

Simulated data

ewg

*EWG Mixture Model Dataset***Description**

Demonstration dataset for Exponential-Weibull-Gamma mixture models. Contains 5 simulated datasets for examples and testing.

Usage

ewg

Format

A list with 5 components, each containing:

Source

Simulated data

Examples

```
data(ewg)
str(ewg, max.level = 1)
# Extract data from first element
y_data <- ewg[[1]]$
```

ewgmix

*Exponential-Weibull-Gamma Mixture Model***Description**

Exponential-Weibull-Gamma Mixture Model

Usage

```
ewgmix(d, init_values, mcmc_values, prior)
```

Arguments

d	Input data
init_values	Initial values
mcmc_values	MCMC parameters
prior	Prior distributions

Value

Model results

ewmix*Exponential-Weibull Mixture Model*

Description

Exponential-Weibull Mixture Model

Usage

```
ewmix(d, init_values, mcmc_values, prior)
```

Arguments

d	Input data
init_values	Initial values
mcmc_values	MCMC parameters
prior	Prior distributions

Value

Model results

ll*LL Mixture Model Dataset*

Description

Demonstration dataset for Log-Logistic mixture models. Contains 5 simulated datasets for examples and testing.

Usage

```
ll
```

Format

A list with 5 components, each containing mixture model data

Source

Simulated data

llmix*Lognormal-Lognormal Mixture Model***Description**

Lognormal-Lognormal Mixture Model

Usage

```
llmix(d, init_values, mcmc_values, prior)
```

Arguments

<code>d</code>	Input data
<code>init_values</code>	Initial values
<code>mcmc_values</code>	MCMC parameters
<code>prior</code>	Prior distributions

Value

Model results

summary.alpmixBayes*Summary method for alpmixBayes objects***Description**

Summary method for alpmixBayes objects

Usage

```
## S3 method for class 'alpmixBayes'
summary(object, ...)
```

Arguments

<code>object</code>	An alpmixBayes object
<code>...</code>	Additional arguments passed to summary

Value

A data frame with parameter estimates and credible intervals

ww*WW Mixture Model Dataset*

Description

Demonstration dataset for Weibull mixture models. Contains 5 simulated datasets for examples and testing.

Usage

```
ww
```

Format

A list with 5 components, each containing mixture model data

Source

Simulated data

wwmix*Weibull-Weibull Mixture Model*

Description

Weibull-Weibull Mixture Model

Usage

```
wwmix(d, init_values, mcmc_values, prior)
```

Arguments

d	Input data
init_values	Initial values
mcmc_values	MCMC parameters
prior	Prior distributions

Value

Model results

Index

* datasets

ew, [3](#)

ewg, [4](#)

ll, [5](#)

ww, [7](#)

alpmixBayes, [2](#)

demo_run, [3](#)

ew, [3](#)

ewg, [4](#)

ewgmix, [4](#)

ewmix, [5](#)

ll, [5](#)

llmix, [6](#)

summary.alpmixBayes, [6](#)

ww, [7](#)

wwmix, [7](#)