

Package ‘truncnormbayes’

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Title Estimates Moments for a Truncated Normal Distribution using
‘Stan’

Version 0.0.2

Description Finds the posterior modes for the mean and standard deviation for a truncated normal distribution with one or two known truncation points. The method used extends Bayesian methods for parameter estimation for a singly truncated normal distribution under the Jeffreys prior (see Zhou X, Giacometti R, Fabozzi FJ, Tucker AH (2014). “Bayesian estimation of truncated data with applications to operational risk measurement”. <[doi:10.1080/14697688.2012.752103](https://doi.org/10.1080/14697688.2012.752103)>). This package additionally allows for a doubly truncated normal distribution.

URL <https://github.com/leonkt/truncnormbayes>

BugReports <https://github.com/leonkt/truncnormbayes/issues>

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.2.1

Biarch true

RdMacros Rdpack

Depends R (>= 3.4.0)

Imports methods, Rcpp (>= 0.12.0), RcppParallel (>= 5.0.1), Rdpack,
rstan (>= 2.18.1), rstantools (>= 2.2.0), stats

LinkingTo BH (>= 1.66.0), Rcpp (>= 0.12.0), RcppEigen (>= 0.3.3.3.0),
RcppParallel (>= 5.0.1), rstan (>= 2.18.1), StanHeaders (>= 2.18.0)

Suggests testthat (>= 3.0.0), truncnorm (>= 1.0), withr (>= 2.5.0)

Config/testthat/edition 3

SystemRequirements GNU make

NeedsCompilation yes

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trunc_est	<i>Estimate truncated normal distribution</i>
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Description

Estimates the posterior modes for the mean (μ) and standard deviation (σ) of the underlying normal distribution, given truncated data with known truncation point(s).

Usage

```
trunc_est(x, a, b, mu_start = 0, sigma_start = 1, ci_level = 0.95, ...)
```

Arguments

<code>x</code>	Vector of observations from truncated normal.
<code>a</code>	Left truncation limit.
<code>b</code>	Right truncation limit.
<code>mu_start</code>	Initial value for μ .
<code>sigma_start</code>	Initial value for σ .
<code>ci_level</code>	Confidence level of the interval – gives a $100 \times \text{ci_level}\%$ symmetric HPD interval (defaults to 95%).
<code>...</code>	Parameters to pass to <code>rstan::sampling()</code> .

Value

A list with two elements:

stats A data frame with two rows and the columns `param` (`mu`, `sd`), `mode` (posterior mode), `mean` (posterior mean), `median` (posterior median), `se` (standard error), `ci_lower` (lower CI bound), `ci_upper` (upper CI bound), `rhat`.

fit A `stanfit` object (the result of fitting the model).

References

Zhou X, Giacometti R, Fabozzi FJ, Tucker AH (2014). “Bayesian estimation of truncated data with applications to operational risk measurement.” *Quantitative Finance*, **14**(5), 863–888. doi:10.1080/14697688.2012.752103.

Stan Development Team (2022). “RStan: the R interface to Stan.” R package version 2.21.5. <https://mc-stan.org>.

Examples

```
set.seed(22)
x <- truncnorm::rtruncnorm(100, a = -1, b = 2, mean = 0.5, sd = 0.5)
trunc_est(x, a = -1, b = 2)
```

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