

Package ‘truncnormbayes’

July 22, 2025

Title Estimates Moments for a Truncated Normal Distribution using
'Stan'

Version 0.0.3

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/mathurlabstanford/truncnormbayes>,
<https://mathurlabstanford.github.io/truncnormbayes/>

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

License GPL (>= 3)

Encoding UTF-8

RoxygenNote 7.2.3

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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Repository CRAN

Date/Publication 2023-08-23 07:30:02 UTC

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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

x	Vector of observations from truncated normal.
a	Left truncation limit.
b	Right truncation limit.
mu_start	Initial value for μ .
sigma_start	Initial value for σ .
ci_level	Confidence level of the interval – gives a 100*ci_level% symmetric HPD interval (defaults to 95%).
...	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 (μ , σ), 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](https://doi.org/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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