Package 'truncnormbayes'

October 14, 2022

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>). 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

Author Mika Braginsky [aut, cre],
Leon Tran [aut],
Maya Mathur [ctb]

Maintainer Mika Braginsky <mika.br@gmail.com>

Repository CRAN

Date/Publication 2022-09-09 10:30:02 UTC

R topics documented:

`trunc_est` *Estimate truncated normal distribution*

Description

Estimates the posterior modes for the mean (mu) and standard deviation (sigma) 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 mu.
`sigma_start`	Initial value for sigma.
`ci_level`	Confidence level of the interval – gives a 100*ci_level% symmetric HPD interval (defaults to 95%).
`...`	Parameters to pass to `rstan::sampling()`.

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)
```

Index