

Package ‘thames’

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Type Package
Title Truncated Harmonic Mean Estimator of the Marginal Likelihood
Version 0.1.2
Description Implements the truncated harmonic mean estimator (THAMES) of the reciprocal marginal likelihood using posterior samples and unnormalized log posterior values via reciprocal importance sampling. Metodiev, Perrot-Dockès, Ouadah, Irons, Latouche, & Raftery (2024). Bayesian Analysis. <doi:10.1214/24-BA1422>.
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thames

*THAMES estimator of the (reciprocal) log marginal likelihood***Description**

This function computes the THAMES estimate of the reciprocal log marginal likelihood using posterior samples and unnormalized log posterior values.

Usage

```
thames(
  lps = NULL,
  params,
  n_samples = NULL,
  d = NULL,
  radius = NULL,
  p = 0.025,
  q = 1 - p,
  lp_func = NULL,
  bound = NULL,
  n_simuls = 1e+05
)
```

Arguments

<code>lps</code>	vector of unnormalized log posterior values of length <code>n_samples</code> (sum of the log prior and the log likelihood)
<code>params</code>	matrix of parameter posterior samples of dimension <code>n_samples * d</code>
<code>n_samples</code>	integer, number of posterior samples
<code>d</code>	integer, dimension of parameter space
<code>radius</code>	positive number, radius to use for defining the ellipsoid A
<code>p</code>	percentile, used for lower bound of confidence interval
<code>q</code>	percentile, used for upper bound of confidence interval
<code>lp_func</code>	function to compute unnormalized log posterior values
<code>bound</code>	function calculating membership of a point in the posterior support
<code>n_simuls</code>	integer, number of Monte Carlo simulations to use in the bounded parameter correction calculation.

Value

Returns a named list with the following elements:

References

Metodiev M, Perrot-Dockès M, Ouadah S, Irons N. J., Latouche P., Raftery A. E. (2024) Easily Computed Marginal Likelihoods from Posterior Simulation Using the THAMES Estimator. Bayesian Analysis.

Examples

```
mu_star = 1
n <- 50
Y = rnorm(n, mu_star, 1)
sig2 <- 1
sig2_n <- 1/(n+1/sig2)
mn <- sum(Y)/(n + 1/sig2)
params <- rnorm(20, mean=mn, (sig2_n))
lps <- sapply(params, function(i){
  sum(dnorm(Y,i,1,log = TRUE)) + dnorm(i,0,sig2, log = TRUE)})
thames(lps, params)
```

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