

# Package ‘thames’

October 28, 2023

**Type** Package

**Title** Truncated Harmonic Mean Estimator of the Marginal Likelihood

**Version** 0.1.1

**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, & Raftery (2023) <[arXiv:2305.08952](https://arxiv.org/abs/2305.08952)>.

**License** GPL (>= 3)

**Encoding** UTF-8

**RoxygenNote** 7.2.3

**Imports** uniformly, stats

**Suggests** knitr, rmarkdown, mvtnorm

**VignetteBuilder** knitr

**NeedsCompilation** no

**Author** Nicholas J. Irons [aut, cre] (<<https://orcid.org/0000-0002-9720-8259>>),  
Marie Perrot-Dockès [aut],  
Martin Metodiev [aut]

**Maintainer** Nicholas J. Irons <nicholasjonirons@gmail.com>

**Repository** CRAN

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 thames

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


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### 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

lps	vector of unnormalized log posterior values of length n_samples (sum of the log prior and the log likelihood)
params	matrix of parameter posterior samples of dimension n_samples * d
n_samples	integer, number of posterior samples
d	integer, dimension of parameter space
radius	positive number, radius to use for defining the ellipsoid A
p	percentile, used for lower bound of confidence interval
q	percentile, used for upper bound of confidence interval
lp_func	function to compute unnormalized log posterior values
bound	function calculating membership of a point in the posterior support
n_simuls	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., Raftery A. E. (2023) Easily Computed Marginal Likelihoods from Posterior Simulation Using the THAMES Estimator. arXiv preprint.

**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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