

# 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>.  
**License** GPL (>= 3)  
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**VignetteBuilder** knitr, rmarkdown  
**NeedsCompilation** no  
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thames

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*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

|                        |                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <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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