Package 'dsample'

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Type Package

Title Discretization-Based Direct Random Sample Generation

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Description Two discretization-based Monte Carlo algorithms, namely the Fu-Wang algorithm and the Wang-Lee algorithm, are provided for random sample generation from a high dimensional distribution of complex structure. The normalizing constant of the target distribution needs not to be known.

Depends R (>= 2.7.0)

Imports stats, graphics, MASS

License GPL (>= 2)

URL https://r-forge.r-project.org/projects/wanglee/

BugReports chl948@mail.usask.ca

NeedsCompilation no

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R topics documented:

dsample *Random Samples Generation Through The Wang-Lee and Fu-Wang Algorithms*

Description

`sample.wl` generates a sample of specified size `n` from the target density funciton (up to a normalizing constant) based on the Wang-Lee algorithm

Usage

```
dsample(expr, rpmat, n = 1000, nk = 10000, wconst)
```

Arguments

`expr`	expression
`rpmat`	matrix containing random points for discretization
`n`	a non-negative integer, the desired sample size.
`nk`	a positive integer, the number of contours. See 'Details'.
`wconst`	a real number between 0 and 1. See 'Details'.

Details

`X` has the number of rows equals to the number of discrete base points. In each row, the first element contians the funcitonal value of the target density and the rest elements are the coordinates at which the density is evaluated. `wconst` is a constant for adjusting the volumn of the last contour.

Value

`sample.wl` gives the drawn sample as a `data.frame` with number of rows equals the specified size `n` and number of columns equals `ncol(x)-1`.

Author(s)

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References

Wang, L. and Lee, C.H. (2014). Discretization-based direct random sample generation. Computational Statistics and Data Analysis, 71, 1001-1010. Lee, C.H. (2009). Efficient Monte Carlo Random Sample Generation through Discretization, MSc thesis, Department of Satistics, University of Manitoba, Canada Wang, L. and Fu, J. (2007). A practical sampling approach for a bayesian mixture model with unknown number of components. Statistical Papers, 48(4):631-653. Fu, J. C. and Wang, L. (2002). A random-discretization based Monte Carlo sampling method and its application. Methodology and Computing in Applied Probability, 4, 5-25.

Examples

```
## The following example is taken from West (1993, page 414).
## West, M. (1993). Approximating posterior distributions by mixture.
##   Journal of the Royal Statistical Society - B, 55, 409-422.

expr <- expression((x1*(1-x2))^5 * (x2*(1-x1))^3 * (1-x1*(1-x2)-x2*(1-x1))^37)
sets <- list(x1=runif(1e5), x2=runif(1e5))
smp <- dsample(expr=expr, rpmat=sets, nk=1e4, n=1e3)

##
## More accurate results can be achieved by increasing the number
## of dicretization points and the number of contours.
```

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plot.dsample *Plot dsample objects*

Description

Plot dsample objects

Usage

```
## S3 method for class 'dsample'
plot(x, ...)
```

Arguments

x	dsample object.
...	arguments passing functions inside.

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summary.dsample *Generating Basic Summary Statistics of Marginal Distributions*

Description

Producing basic summary statistics (the mean, the standard deviation and the first five modes) from the sample drawn via either the Fu-Wang algorithm or the Wang-Lee algorithm, for all marginal distributions of the target distribution.

Usage

```
## S3 method for class 'dsample'
summary(object, n = 5, ...)
```

Arguments

object	a data.frame, contains the sample drawn via either the Fu-Wang algorithm or the Wang-Lee algorithm
n	the first n samples
...	more arguments

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