Package ‘dsample’

February 9, 2023

Title  Discretization-Based Direct Random Sample Generation
Version  0.91.3.4
Description  Discretization-based random sampling algorithm that is useful for a complex model in high di-
mension is implemented. The normalizing constant of a target distribution is not needed. Poste-
rrior summaries are compared with those by ‘OpenBUGS’. The method is de-
License  GPL-3
Encoding  UTF-8
RoxygenNote  7.1.2
Imports  stats, graphics, MASS, mnormt
Suggests  knitr, rmarkdown
VignetteBuilder  knitr
NeedsCompilation  no
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Repository  CRAN
Date/Publication  2023-02-09 16:00:06 UTC

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dsample  \hspace{1cm} \textit{Generating Random Samples via Wang-Lee algorithm}

\section*{Description}

\texttt{dsample} generates a sample of specified size \texttt{n} from the target density function (up to a normalizing constant) based on the Wang-Lee algorithm.

\section*{Usage}

\texttt{dsample(expr, rpmat, n = 1000, nk = 10000, wconst)}

\section*{Arguments}

\begin{itemize}
  \item \texttt{expr} \hspace{1cm} expression of a target density function
  \item \texttt{rpmat} \hspace{1cm} matrix containing random points for discretization
  \item \texttt{n} \hspace{1cm} non-negative integer, the desired sample size.
  \item \texttt{nk} \hspace{1cm} positive integer, the number of contours. See ‘Details’.
  \item \texttt{wconst} \hspace{1cm} real number between 0 and 1. See ‘Details’.
\end{itemize}

\section*{Details}

\texttt{X} has the number of rows equals to the number of discrete base points. In each row, the first element contains the functional value of the target density and the rest elements are the coordinates at which the density is evaluated. \texttt{wconst} is a constant for adjusting the volume of the last contour.

\section*{Value}

\texttt{dsample} gives the samples in \texttt{data.frame} with number of rows \texttt{n} and number of columns \texttt{ncol(rpmat)}.

\section*{References}


\section*{Examples}

\begin{verbatim}
## Example on page 414 in West (1993)
expr <- expression((x1*(1-x2))^5 * (x2*(1-x1))^3 * (1-x1*(1-x2)-x2*(1-x1))^37)
sets <- list(x1=runif(1e3), x2=runif(1e3))
smp <- dsample(expr=expr, rpmat=sets, nk=1e2, n=1e3)
\end{verbatim}
plot.dsample

Visualizing Wang-Lee Samples

Description
The samples generated by the Wang-Lee algorithm are plotted for visual examination. The plot is useful when multiple modes exist.

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

Arguments
- `x`: an object produced by `dsample`.
- `which`: plot type, 1: CDF, 2: Contours, and 3: Histogram.
- `...`: arguments passing functions inside

Value
`plot.dsample` has no return value.

summary.dsample

Summary Statistics of Marginal Distributions

Description
Producing basic summary statistics (mean, standard deviation and the first five modes) from the sample drawn for all marginal distributions.

Usage
```r
## S3 method for class 'dsample'
summary(object, n = 5, k = 1, ...)
```

Arguments
- `object`: data.frame containing the samples drawn
- `n`: the first n samples
- `k`: number of clusters
- `...`: arguments passing to the functions used internally
### Value

`summary.dsample` gives a list of summary statistics.

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