Package ‘ars’

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Title     Adaptive Rejection Sampling
Version   0.5
Date      2014-12-03
Author    Paulino Perez Rodriguez<br/>original C++ code from Arnost Komarek based on ars.f written by P. Wild and W. R. Gilks
Maintainer Paulino Perez Rodriguez<br/>
Depends   R (>= 3.1.2)
Description Adaptive Rejection Sampling. Original version
License   GPL (>= 2)
NeedsCompilation yes
Repository CRAN
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R topics documented:

ars ................................................................. 1
Index 4

ars

Adaptive Rejection Sampling

Description

Adaptive Rejection Sampling from log-concave density functions

Usage

ars(n=1,f,fprima,x=c(-4,1,4),ns=100,m=3,emax=64,lb=FALSE,ub=FALSE,xlb=0,xub=0,...)
Arguments

n  sample size
f  function that computes log(f(u,...)), for given u, where f(u) is proportional to the
density we want to sample from
fprima  d/du log(f(u,...))
x  some starting points in which log(f(u,...)) is defined
ns  maximum number of points defining the hulls
m  number of starting points
emax  large value for which it is possible to compute an exponential
lb  boolean indicating if there is a lower bound to the domain
xlb  value of the lower bound
ub  boolean indicating if there is an upper bound to the domain
xub  value of the upper bound bound
...  arguments to be passed to f and fprima

Details

ifault codes, subroutine initial

1.  0: successful initialisation
2.  1: not enough starting points
3.  2: ns is less than m
4.  3: no abscissae to left of mode (if lb = false)
5.  4: no abscissae to right of mode (if ub = false)
6.  5: non-log-concavity detect

ifault codes, subroutine sample

1.  0: successful sampling
2.  5: non-concavity detected
3.  6: random number generator generated zero
4.  7: numerical instability

Value

a sampled value from density

Author(s)

Paulino Perez Rodriguez, original C++ code from Arnost Komarek based on ars.f written by P. Wild
and W. R. Gilks
References


Examples

library(ars)

#Example 1: sample 20 values from the normal distribution N(2,3)
f<-function(x,mu=0,sigma=1){-1/(2*sigma^2)*(x-mu)^2}
fprima<-function(x,mu=0,sigma=1){-1/sigma^2*(x-mu)}
mysample<-ars(R0LfLfprimaLmu=RLsigma=S)
mysample
hist(mysample)

#Example 2: sample 20 values from a gamma(2,0.5)
f1<-function(x,shape,scale=1){(shape-1)*log(x)-x/scale}
f1prima<-function(x,shape,scale=1){(shape-1)/x-1/scale}
mysample1<-ars(R0Lf1Lf1primaLx=TNULm=1Llb=trueLxlb=0Lshape=RLscale=0NU)
mysample1
hist(mysample1)

#Example 3: sample 20 values from a beta(1,3,2.7) distribution
f2<-function(x,a,b){(a-1)*log(x)+(b-1)*log(1-x)}
f2prima<-function(x,a,b){(a-1)/x-(b-1)/(1-x)}
mysample2<-ars(R0Lf2Lf2primaLx=c(0NSL0N6)Lm=RLlb=trueLxlb=0Lub=trueLxub=1La=1NSLb=RN7)
mysample2
hist(mysample2)
Index

*Topic distribution
  ars, 1

ars, 1