Package ‘mvprpb’

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Type Package
Title Orthant Probability of the Multivariate Normal Distribution
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Description Computes orthant probabilities multivariate normal distribution.
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Description

Evaluation orthant probabilities of non-degenerate multivariate normal distribution based on orthogonal projections to subspaces.

Details
This program evaluates the probabilities of multivariate distribution based on orthogonal projections to subspaces.

**Author(s)**

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**References**


**Examples**

```r
dim.p <- 8
mu <- c(rep(-0.5, dim.p-1), 3)
cov <- diag(dim.p) * 0.5 + 0.5
n.itr <- 800
integ.range <- 10
res.val <- mvorpb(dim.p, mu, cov, n.itr, integ.range)
print(res.val)
```

mvorpb  

*Depends: R(>= 3.0.3)*

**Description**

Orthant Probability of the Multivariate Normal Distribution

**Usage**

```r
mvorpb(dim.p, m.tgt, v.tgt, n.itr, it.rg)
```
Arguments

dim.p  Dimension to evaluate (Integer, Scalar)
m.tgt  Mean vector (Real vector, length: dim.p).
v.tgt  Covariance Matrix (Real square matrix of size dim.p).
n.itr  Number of intervals for numerical integration. Too small n.itr increases the error of the returned value, but too large n.itr requires large memory size as well as computation time.
it.rg  Maximum point of the numerical integration range. Too small it.rg increases the error of the returned value due to integration range. Estimated upper bound of caused by finiteness of it.rg will be given by the attribute with returned value. On the other hand, too large it.rg also increases the error because widths between grid points in numerical integration is inverse proportional to it.rg, and it.rg should be set with the consideration of balance it.rg and n.itr.

Details

This program evaluates the orthant probability of multivariate normal distribution based on orthogonal projections to subspaces. The covariance matrix is assumed to be nonsingular. The implemented procedure is described in Nomura (2014). The value is evaluated through applying numerical integration iteratively. The number of the intervals for numerical integration is given by n.itr and grid points are placed equidistantly between zero and it.rg in the transformed space.

Value

The evaluated orthant probability is returned with attributes

error-itg-rg  Estimated upper bound of error caused by finiteness of the interval of the integration

Author(s)

Noboru Nomura

References


Examples

dim.p <- 8
mu  <- c( rep(- 0.5 , dim.p -1) , 3 )
cov <- diag( dim.p ) * 0.5 + 0.5
n.itr <- 800
integ.range <- 10
res.val <- mvorpb( dim.p , mu , cov ,n.itr , integ.range )
print(res.val)
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