Package 'pbivnorm'

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Title Vectorized Bivariate Normal CDF

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Author Fortran code by Alan Genz. R code by Brenton Kenkel, based on Adelchi Azzalini's 'mnormt' package.

Maintainer Brenton Kenkel <brenton.kenkel@gmail.com>

Description Provides a vectorized R function for calculating probabilities from a standard bivariate normal CDF.

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URL https://github.com/brentonk/pbivnorm

NeedsCompilation yes

Repository CRAN

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R topics documented:

`pbivnorm` *Standard bivariate normal CDF*

Description

Calculate probabilities from the CDF of a standard bivariate normal distribution.

Usage

```
pbivnorm(x, y, rho = 0, recycle = TRUE)
```

Arguments

x	vector of upper integration limits for the CDF. May also be a two-column matrix, in which case y should not be used.
y	vector of upper integration limits.
rho	correlation parameter.
recycle	whether to automatically recycle the vectors x, y, and rho to conform to whichever is longest. If FALSE, all three must be the same length.

Details

This function returns values identical to those of biv.nt.prob in the **mnormt** package, but is vectorized to reduce the number of Fortran calls required for computation of many probabilities.

Value

Numeric vector of probabilities.

Author(s)

Fortran code by Alan Genz (see references). R interface by Brenton Kenkel (<brenton.kenkel@gmail.com>), based on code from Adelchi Azzalini's **mnormt** package.

References

Genz, A. (1992). Numerical Computation of Multivariate Normal Probabilities. *J. Computational and Graphical Statist.*, **1**, 141–149.

Genz, A. (1993). Comparison of methods for the computation of multivariate normal probabilities. *Computing Science and Statistics*, **25**, 400–405.

Genz, A. Fortran code for MVTDSTPACK available at http://www.math.wsu.edu/math/faculty/genz/software/fort77/mvtdstpack.f (as of 2011-02-21).

Examples

```
x <- rnorm(10)
y <- rnorm(10)
rho <- runif(10)

pbivnorm(x, y, rho)

X <- cbind(x, y)
pbivnorm(X, rho = rho)

## rho can be a single value, unless recycling is disallowed
rho <- runif(1)
pbivnorm(x, y, rho)
```

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