Package ‘bridgedist’

April 22, 2016


Version 0.1.0

Description An implementation of the bridge distribution with logit-link in R. In Wang and Louis (2003) <DOI:10.1093/biomet/90.4.765>, such a univariate bridge distribution was derived as the distribution of the random intercept that 'bridged' a marginal logistic regression and a conditional logistic regression. The conditional and marginal regression coefficients are a scalar multiple of each other. Such is not the case if the random intercept distribution was Gaussian.

Depends R (>= 3.0.0)

License GPL-2

LazyData true

RoxygenNote 5.0.1

Suggests knitr, rmarkdown, reshape2, ggplot2, testthat

Imports stats

VignetteBuilder knitr

URL http://github.com/swihart/bridgedist

BugReports http://github.com/swihart/bridgedist/issues

NeedsCompilation no

Author Bruce Swihart [aut, cre]

Maintainer Bruce Swihart <bruce.swihart@gmail.com>

Repository CRAN

Date/Publication 2016-04-22 15:30:23

R topics documented:

Bridge .............................................................................................................. 2

Index 4

1
Description

Density, distribution function, quantile function and random generation for the bridge distribution with parameter scale. See Wang and Louis (2003).

Usage

dbridge(x, scale = 1/2, log = FALSE)
pbridge(q, scale = 1/2, lower.tail = TRUE, log.p = FALSE)
qbridge(p, scale = 1/2, lower.tail = TRUE, log.p = FALSE)
rbridge(n, scale = 1/2)

Arguments

x, q vector of quantiles.
scale scale parameter. The scale must be between 0 and 1. A scale of 1/sqrt(1+3/pi^2) gives unit variance.
log, log.p logical; if TRUE, probabilities p are given as log(p).
lower.tail logical; if TRUE (default), probabilities are \( P[X \leq x] \), otherwise, \( P[X > x] \).
p vector of probabilities.
n number of observations. If length(n) > 1, the length is taken to be the number required.

Details

If scale is omitted, the default value 1/2 is assumed.

The Bridge distribution parameterized by scale has distribution function

\[
d(x) = \frac{1}{\sqrt{1+3/\pi^2}} \left( 1 - \frac{x^2}{\phi^2} \right) \text{ for } -\phi \leq x \leq \phi,
\]

and density

\[
f(x) = \frac{1}{\sqrt{1+3/\pi^2}} \left( 1 - \frac{x^2}{\phi^2} \right) \text{ for } -\phi \leq x \leq \phi.
\]

The mean is \( \mu \) and the variance is \( \pi^2(\phi^{-2} - 1)/3 \).
Value

dbridge gives the density, pbridge gives the distribution function, qbridge gives the quantile function, and rbridge generates random deviates.

The length of the result is determined by n for rbridge, and is the maximum of the lengths of the numerical arguments for the other functions.

The numerical arguments other than n are recycled to the length of the result. Only the first elements of the logical arguments are used.

Note

Consult the vignette for some figures comparing the normal, logistic, and bridge distributions.

Source

[dpq]bridge are calculated directly from the definitions.

rbridge uses inversion.

References


See also:


See Also

Distributions for other standard distributions.

Examples

```r
## Confirm unit variance for scale = 1/sqrt(1+3/pi^2)
var(rbridge(1e5, scale = 1/sqrt(1+3/pi^2)))  # approximately 1
```
Index

*Topic distribution
  Bridge, 2

Bridge, 2
bridge (Bridge), 2
bridgedist (Bridge), 2
dbridge (Bridge), 2
Distributions, 3
pbridge (Bridge), 2
qbridge (Bridge), 2
rbridge (Bridge), 2