

# Package ‘Wrapped’

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**Type** Package

**Title** Computes Pdf, Cdf, Quantile, Random Numbers and Provides Estimation for 40 Univariate Wrapped Distributions

**Version** 1.0

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**Depends** R (>= 3.0.1)

**Imports** AdequacyModel, evd, sn, ald, NormalLaplace, GeneralizedHyperbolic, glogis, irtProb, sld, normalp, gamlss.dist, sgt, SkewHyperbolic, fBasics, cubfits, lqmm, LCA, GEVStableGarch, VarianceGamma, VGAM, ordinal

**Description** Computes the probability density function, cumulative distribution function, quantile function and random numbers for 40 univariate wrapped distributions. They include the wrapped normal, wrapped Gumbel, wrapped logistic, wrapped t, wrapped Cauchy, wrapped skew normal, wrapped skew t, wrapped asymmetric Laplace, wrapped normal Laplace, wrapped skew Laplace, wrapped skew logistic, wrapped exponential power, wrapped skew power exponential, wrapped power exponential t, wrapped skew generalized t, wrapped skew hyperbolic, wrapped generalized hyperbolic Student t, wrapped power hyperbola logistic, wrapped Kiener, wrapped Laplace mixture, wrapped skew Laplace, wrapped polynomial tail Laplace, wrapped generalized asymmetric t, wrapped variance gamma, wrapped normal inverse gamma, wrapped skew Cauchy, wrapped slash, wrapped ex Gaussian, wrapped stable and wrapped log gamma distributions. Also given are maximum likelihood estimates of the parameters, standard errors, 95 percent confidence intervals, log-likelihood values, AIC values, CAIC values, BIC values, HQIC values, values of the W statistic, values of the A statistic, values of the KS statistic and the associated p-value.

**License** GPL (>= 2)

**NeedsCompilation** no

**Repository** CRAN

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Wrapped-package	<i>Computes Pdf, Cdf, Quantile, Random Numbers and Provides Estimation for 40 Univariate Wrapped Distributions</i>
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### Description

Computes the probability density function, cumulative distribution function, quantile function and random numbers for 40 univariate wrapped distributions. They include the wrapped normal, wrapped Gumbel, wrapped logistic, wrapped t, wrapped Cauchy, wrapped skew normal, wrapped skew t, wrapped asymmetric Laplace, wrapped normal Laplace, wrapped skew Laplace, wrapped skew logistic, wrapped exponential power, wrapped skew power exponential, wrapped power exponential t, wrapped skew generalized t, wrapped skew hyperbolic, wrapped generalized hyperbolic Student t, wrapped power hyperbola logistic, wrapped Kiener, wrapped Laplace mixture, wrapped skew Laplace, wrapped polynomial tail Laplace, wrapped generalized asymmetric t, wrapped variance gamma, wrapped normal inverse gamma, wrapped skew Cauchy, wrapped slash, wrapped ex Gaussian, wrapped stable and wrapped log gamma distributions. Also given are maximum likelihood estimates of the parameters, standard errors, 95 percent confidence intervals, log-likelihood values, AIC values, CAIC values, BIC values, HQIC values, values of the W statistic, values of the A statistic, values of the KS tatistic and the associated p-value.

### Details

Package: Wrapped  
 Type: Package  
 Version: 1.0  
 Date: 2017-01-31  
 License: GPL(>=2)

probability density function, cumulative distribution function, quantile function, random numbers and measures of inference

### Author(s)

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### References

S. Nadarajah and Y. Zhang, Wrapped: A new R package for wrapped distributions, submitted.

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 wrappedg

 Wrapped G Distribution
 

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### Description

Computes the pdf, cdf, quantile, random numbers for wrapped G distributions. Also computes the Cramer-von Misses statistic, Anderson Darling statistic, Kolmogorov Smirnov test statistic and p-value, maximum likelihood estimates, Akaike Information Criterion, Consistent Akaike's Information Criterion, Bayesian Information Criterion, Hannan-Quinn information criterion, standard errors of the maximum likelihood estimates, minimum value of the negative log-likelihood function and convergence status when the distribution is fitted to some data

### Usage

```
dwrappedg(x, spec, K = K, ...)
pwrappedg(x, spec, K = K, ...)
qwrappedg(p, spec, K = K, ...)
rwrappedg(n, spec, ...)
mwrappedg(g, data, starts, K = K, method = "BFGS")
```

### Arguments

x	scaler or vector of values at which the pdf or cdf needs to be computed
p	scaler or vector of probabilities at which the quantile needs to be computed
n	number of random numbers to be generated
K	the limit used to approximate the wrapped G distribution, for example, the wrapped G pdf is approximated by the sum of $g(x+2\pi k)$ , ... from $k=-K$ to $k=K$ , where $g$ denotes the pdf specified by <code>spec</code>
spec	a character string specifying the distribution of $G$ and $g$ (for example, "norm" if $G$ and $g$ correspond to the standard normal).
...	other parameters
g	same as <code>spec</code> but must be one of normal ("norm", package base), Gumbel ("gumbel", package evd), logistic ("logis", package base), Student t ("t", package base), Cauchy ("cauchy", package base), skew normal ("sn", package sn), skew t ("st", package st), asymmetric Laplace ("ald", package ald), normal Laplace ("nl", NormalLaplace), skew Laplace ("skewlap", GeneralizedHyperbolic), generalized logistic ("glogis", package glogis), four parameter logistic ("4pl", package irtProb), skew logistic ("sl", package sld), exponential power ("normalp", package normalp), skew exponential power of type 1 ("SEP1", package gamlss.dist), skew exponential power of type 2 ("SEP2", package gamlss.dist), skew exponential power of type 3 ("SEP3", package gamlss.dist), skew exponential power of type 4 ("SEP4", package gamlss.dist), normal exponential t ("NET", package

gamlss.dist), skew normal type 2 ("SN2", package gamlss.dist), skew generalized t ("sgt", package sgt), skew hyperbolic ("skewhyp", package SkewHyperbolic), generalized hyperbolic Student t ("ght", package fBasics), power hyperbola logistic ("logishp", package FatTailsR), Kiener ("kiener1", package FatTailsR), Laplace mixture ("laplacem", package LaplacesDemon), skew Laplace ("skewlaplace", package rmutil), asymmetric Laplace ("asl", package cubfits), asymmetric Laplace ("asla", package cubfits), asymmetric Laplace ("al", package lqmm), polynomial tail Laplace ("ptl", package LCA), generalized asymmetric t ("gat", package GEVStableGarch), variance gamma ("vg", package VarianceGamma), normal inverse gamma ("nig", package GeneralizedHyperbolic), skew Cauchy ("sc", package sn), slash ("slash", package VGAM), ex Gaussian ("exGAUS", package gamlss.dist), stable ("stable", package stable) and log gamma ("lgamma", package ordinal). For details including the density function and parameter specifications see Nadarajah and Zhang (2017)

data	a vector of data values for which the distribution is to be fitted
starts	initial values for the parameters of the distributions specified by g
method	the method for optimizing the log likelihood function. It can be one of "Nelder-Mead", "BFGS", "CG", "L-BFGS-B" or "SANN". The default is "BFGS". The details of these methods can be found in the manual pages for <code>optim</code>

### Value

An object of the same length as `x`, giving the pdf or cdf values computed at `x` or an object of the same length as `p`, giving the quantile values computed at `p` or an object of the same length as `n`, giving the random numbers generated or an object giving the values of Cramer-von Misses statistic, Anderson Darling statistic, Kolmogorov Smirnov test statistic and p-value, maximum likelihood estimates, Akaike Information Criterion, Consistent Akaike Information Criterion, Bayesian Information Criterion, Hannan-Quinn information criterion, standard errors of the maximum likelihood estimates, minimum value of the negative log-likelihood function and convergence status.

### Author(s)

Saralees Nadarajah, Yuanyuan Zhang

### References

S. Nadarajah and Y. Zhang, Wrapped: A new R package for wrapped distributions, submitted

### Examples

```
x=runif(10,min=-1,max=1)
dwrappedg(x,"norm",mean=1,sd=1,K=1000)
pwrappedg(x,"norm",mean=1,sd=1,K=1000)
qwrappedg(runif(10,min=0,max=1),"norm",mean=1,sd=1,K=1000)
rwrappedg(10,"norm",mean=1,sd=1)
mwrappedg("norm",runif(100,min=-1,max=1),starts=c(1,1),K=10,method="BFGS")
```

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