

Package ‘robustloggamma’

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Title Robust Estimation of the Generalized log Gamma Model

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Description Robust estimation of the generalized log gamma model is provided using Quantile Tau estimator, Weighted Likelihood estimator and Truncated Maximum Likelihood estimator. Functions for regression and censored data are also available.

Depends R (>= 2.15.1)

Imports robustbase, survival, numDeriv, RobustAFT (>= 1.4-1)

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NeedsCompilation yes

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alcoa *Quality assurance measurement on aluminium.*

Description

Three samples (with labels A,B and C) from measurement quality assurance (QA) data base of ALCOA aluminium refineries in Western Australia.

Usage

`data(alcoa)`

Format

A data frame with 668 observations on the following 3 variables.

`dist` a numeric vector

`ratio` a numeric vector

`label` a factor with levels A B C

Details

Under ALCOA's QA program, several thousand bauxite ore samples are routinely submitted to Fourier transform infrared spectroscopy (Eyer and Riley, 1999). Part of the quality assurance is the need to automatically highlight unusual spectra and this is obtained with the help of special statistical diagnostics - called representation indicators - derived from the Fourier transform.

Source

Alcoa World Alumina

Clarke B.R., McKinnon P.L., Riley G. (2012). A fast robust method for fitting gamma distributions. *Statistical Papers*, 53, 4, 1001-1014.

References

C. Agostinelli, A. Marazzi and V.J. Yohai (2015). Robust estimates of the generalized loggamma distribution. *Technometrics*, Volume 56, Issue 1, 2014. doi:10.1080/00401706.2013.818578

Clarke B.R., McKinnon P.L., Riley G. (2012). A fast robust method for fitting gamma distributions. *Statistical Papers*, 53, 4, 1001-1014.

Eyer S., Riley G. (1999). Measurement quality assurance in a production system for bauxite analysis by FTIR. North American Chapter of the International Chemometrics Society, Newsl No. 19.

Examples

```
data(alcoa)
par(mfcol=c(1,2))
boxplot(I(log(alcoa$ratio))~alcoa$label)
boxplot(I(log(alcoa$dist))~alcoa$label)
```

drg2000	<i>Length of stay, cost and AP-DRG for several hospital in Switzerland in 2000.</i>
---------	---

Description

The data refer to 70323 stays that were observed in year 2000 in a group of Swiss hospitals within a pilot study aimed at the implementation of a diagnosis-related grouping (DRG) system. DRG systems are used in modern hospital management to classify each individual stay into a group according to the patient characteristics.

Usage

```
data(drg2000)
```

Format

A data frame with 70323 observations on the following 4 variables.

LOS numeric. Length of the hospitalization (LOS).

Cost numeric. Cost of the hospitalization in Switzerland franc.

MDC numeric. Major Diagnostic Category.

APDRG numeric. All Patient Diagnosis Related Group.

References

Agostinelli C., Marazzi A., Yohai V.J., Randriamiharisoa A. (2016). Robust Estimation of the Generalized Loggamma Model: The R Package robustloggamma. *Journal of Statistical Software*, 70(7), 1-21. doi:10.18637/jss.v070.i07

Examples

```
data(drg2000)
str(drg2000)
```

loggammacenslmrob	<i>Robust estimation of an Accelerated Failure Time model with extended Log Gamma errors in presence of censored observations.</i>
-------------------	--

Description

Three different type of robust procedures are provided for the estimation of the parameters in an Accelerated Failure Time model with extended Log Gamma errors in presence of censored observations. Maximum Likelihood is also provided.

Usage

```
loggammacenslmrob(formula, delta, data, subset, weights,
  na.action, method = c("oneTML", "oneWL", "TWQTau", "TQTau",
  "ML"), model = TRUE, x = !control$compute.rd, y = FALSE,
  singular.ok = TRUE, contrasts = NULL, offset = NULL,
  control = NULL, init = NULL, ...)
```

Arguments

formula	a symbolic description of the model to be fit. See lm and formula for more details.
delta	numeric, 0 or 1. 0 indicated censored observations.
data	an optional data frame, list or environment (or object coercible by as.data.frame to a data frame) containing the variables in the model. If not found in data, the variables are taken from <code>environment(formula)</code> , typically the environment from which <code>loggammacenslmrob</code> is called.
subset	an optional vector specifying a subset of observations to be used in the fitting process.
weights	an optional vector of weights to be used in the fitting process (in addition to the robustness weights computed in the fitting process).
na.action	a function which indicates what should happen when the data contain NAs. The default is set by the <code>na.action</code> setting of options , and is <code>na.fail</code> if that is unset. The “factory-fresh” default is <code>na.omit</code> . Another possible value is <code>NULL</code> , no action. Value <code>na.exclude</code> can be useful.
method	string specifying the estimator-chain. Default is TML one step.
model, x, y	logicals. If <code>TRUE</code> the corresponding components of the fit (the model frame, the model matrix, the response) are returned.
singular.ok	logical. If <code>FALSE</code> (the default in S but not in R) a singular fit is an error.
contrasts	an optional list. See the <code>contrasts.arg</code> of <code>model.matrix.default</code> .
offset	this can be used to specify an <i>a priori</i> known component to be included in the linear predictor during fitting. An offset term can be included in the formula instead or as well, and if both are specified their sum is used.

<code>control</code>	a list specifying control parameters; use the function loggamma<code>rob.control</code> and see its help page.
<code>init</code>	an optional argument to specify or supply the initial estimate. See <i>Details</i> .
<code>...</code>	additional arguments can be used to specify control parameters directly instead of (but not in addition to!) via <code>control</code> .

Value

An object of class `lmrob`; a list including the following components:

<code>coefficients</code>	The estimate of the coefficient vector for the regression part. First element is the intercept and it would be equals to the parameter <code>mu</code> .
<code>mu</code>	The estimate of the intercept parameter.
<code>sigma</code>	The estimate of the scale parameter.
<code>lambda</code>	The estimate of the shape parameter.
<code>fitted.values</code>	Fitted values associated with the estimator.
<code>residuals</code>	Residuals associated with the estimator.
<code>cut.lower, cut.upper</code>	Cut points for the method based on TML (missing for the other methods).
<code>iter</code>	number of iterations.
<code>weights</code>	the specified weights (missing if none were used).
<code>errors</code>	errors messages.
<code>n.ret</code>	number of non zero robust weights for the method based on TML.
<code>control</code>	<code>control</code> argument.
<code>converged</code>	TRUE if the procedure converged.
<code>method</code>	method used during the fit.
<code>rank</code>	the numeric rank of the fitted linear model.
<code>rweights</code>	the “robustness weights”.
<code>df.residual</code>	the residual degrees of freedom.
<code>degree.freedom</code>	the same as <code>df.residual</code>
<code>delta</code>	as in input.
<code>df</code>	a vector with 3 components: (number of linearly independent regressors, <code>df.residual</code> , number of regressors).
<code>xlevels</code>	(only where relevant) a record of the levels of the factors used in fitting.
<code>call</code>	the matched call.
<code>terms</code>	the <code>terms</code> object used.
<code>model</code>	if requested (the default), the model frame used.
<code>x</code>	if requested, the model matrix used.
<code>y</code>	if requested, the response used.
<code>scale</code>	square root of the <code>sigma</code> parameter.

<code>na.action</code>	(where relevant) information returned by <code>model.frame</code> on the special handling of NAs.
<code>offset</code>	the offset used (missing if none were used).
<code>contrasts</code>	(only where relevant) the contrasts used.

In addition, non-null fits will have `qr` relating to the linear fit, for use by extractor functions such as `summary`.

Author(s)

C. Agostinelli, A. Marazzi and V.J. Yohai

References

C. Agostinelli, I. Locatelli, A. Marazzi and V.J. Yohai (2015) Robust estimators of accelerated failure time regression with generalized log-gamma errors. Submitted.

See Also

[loggammacensrob](#) for the case of censored observations without covariates.

Examples

```
## Not run:
n <- 50
p <- 2
set.seed(1234)
X <- matrix(rnorm(p*n, sd=2), ncol=p)
mu <- 2
beta <- rep(2,p)
sigma <- 2
lambda <- 1
linear <- mu + X
y <- rloggamma(n=n, mu=linear, sigma=sigma, lambda=lambda)
cens <- rloggamma(n=n, mu=linear+3, sigma=sigma, lambda=lambda)
delta <- as.numeric(y <= cens)
y[delta==0] <- cens[delta==0]
x <- data.frame(y=as.vector(y), x1=X[,1], x2=X[,2])
res <- loggammacenslmrob(y~x1+x2, delta=delta, data=x)
summary(res)

## End(Not run)
```

loggammacensrob	<i>Robust estimation of the three parameters extended Log Gamma model in presence of censored observations.</i>
-----------------	---

Description

Five different type of robust procedures are provided for the estimation of the parameters in the three parameters extended Log Gamma model in presence of censored observations.

Usage

```
loggammacensrob(x, delta, start=NULL, weights=rep(1, length(x)),
  method=c("oneTML", "oneWL", "TWQTau", "TQTau", "ML"), control, ...)
```

Arguments

x	numeric. A vector with the dataset.
delta	numeric, 0 or 1. 0 indicated censored observations.
start	NULL or numeric. A vector of length 3 to be used when method is WL, oneWL and ML, otherwise starting values are obtained from WQTau in the first two methods and QTau in the last one.
weights	numeric. A vector of weights used in the method TQTau.
method	character. The method used, see Details below. Default is oneTML a one step Truncated Maximum Likelihood estimates starting from TQTau.
control	list. An object from function loggammarob.control .
...	further arguments can be passed directly to the function instead of using the control argument.

Value

An object of class 'loggammacensrob'. A list that includes the following components:

mu	location parameter.
sigma	scale parameter.
lambda	shape parameter.
eta	estimate of $E(\exp(x))$ parameter.
weights	the final weights.
iterations	number of iterations.
error	if not NULL or 0, an error occurred.
data	the original dataset.
delta	the original dataset.
method	the method used.

Author(s)

C. Agostinelli, A. Marazzi and V.J. Yohai

References

C. Agostinelli, I. Locatelli, A. Marazzi and V.J. Yohai (2015) Robust estimators of accelerated failure time regression with generalized log-gamma errors. Submitted.

See Also

[LogGammaDist](#) and [loggammarob](#) for the case without censored observations.

Examples

```
set.seed(1234)
x <- sort(rloggamma(n=80, lambda=1))
cens <- rloggamma(n=80, mu=1.5, lambda=1)
delta <- as.numeric(x <= cens)
x[delta==0] <- cens[delta==0]
res <- loggammacensrob(x, delta, method="oneTML",
  control=loggammarob.control(lower=0, upper=2, n=30))
print(res)
summary(res)
```

LogGammaDist

The Extended Log Gamma Distribution

Description

Density, distribution function, quantile function and random generation for the Extended Log Gamma distribution with parameters μ (location), σ (scale) and λ (shape).

Usage

```
dloggamma(x, mu=0, sigma=1, lambda, log=FALSE, zero=0.0001)
ploggamma(q, mu=0, sigma=1, lambda, lower.tail=TRUE,
  log.p=FALSE, zero=0.0001)
qloggamma(p, mu=0, sigma=1, lambda, zero=0.0001)
rloggamma(n, mu=0, sigma=1, lambda, zero=0.0001)
```

Arguments

x, q	numeric. Vector of quantiles.
p	numeric. Vector of probabilities.
n	numeric. Number of observations.
μ	numeric. Location parameter.
σ	numeric. Scale parameter.

lambda	numeric. Shape parameter.
log, log.p	logical. If TRUE, probabilities/densities p are returned as log(p)
lower.tail	logical. If TRUE (default), probabilities are $P[X \leq x]$, otherwise, $P[X > x]$.
zero	numeric. A threshold, values of lambda smaller than zero will report the asymptotic value of the function at 0.

Value

dloggamma gives the density, ploggamma gives the distribution function, qlongamma gives the quantile function, and rloggamma generates random deviates.

See Also

[GammaDist](#)

Examples

```
set.seed(1234)
x <- rloggamma(10, lambda=1)
x
```

loggammarob	<i>Robust estimation of the three parameters extended Log Gamma model.</i>
-------------	--

Description

Four different type of robust procedures are provided for the estimation of the parameters in the three parameters extended Log Gamma model

Usage

```
loggammarob(x, start=NULL, weights = rep(1, length(x)),
  method=c("oneWL", "WQTau", "WL", "QTau", "ML"), control, ...)
## S3 method for class 'loggammarob'
print(x, digits = max(3, getOption("digits") - 3), ...)
```

Arguments

x	numeric. A vector with the dataset.
start	NULL or numeric. A vector of length 3 to be used when method is WL, oneWL and ML, otherwise starting values are obtained from WQTau in the first two methods and QTau in the last one.
weights	numeric. A vector of weights used in the method QTau.
method	character. The method used, see Details below. Default is oneWL a one step weighted likelihood estimates starting from WQTau.

control	list. An object from function loggammaRob.control .
digits	minimal number of <code>_significant_digits</code> , see print.default .
...	further arguments can be passed directly to the function instead of using the control argument.

Value

An object of class 'loggammaRob'. A list that includes the following components:

mu	location parameter.
sigma	scale parameter.
lambda	shape parameter.
eta	estimate of $E(\exp(x))$ parameter.
weights	the final weights.
iterations	number of iterations.
error	used only in method oneWL. If 1 then the Jacobian matrix is not invertible.
data	the original dataset.
method	the method used.

Author(s)

C. Agostinelli, A. Marazzi, V.J. Yohai and A. Randriamiharisoa

References

C. Agostinelli, A. Marazzi and V.J. Yohai (2015). Robust estimates of the generalized loggamma distribution. *Technometrics*, Volume 56, Issue 1, 2014. doi:10.1080/00401706.2013.818578

Agostinelli C., Marazzi A., Yohai V.J., Randriamiharisoa A. (2016). Robust Estimation of the Generalized Loggamma Model: The R Package robustloggamma. *Journal of Statistical Software*, 70(7), 1-21. doi:10.18637/jss.v070.i07

See Also

[LogGammaDist](#).

Examples

```
set.seed(1234)
x <- sort(rloggamma(n=80, lambda=1))
res <- loggammaRob(x, control=loggammaRob.control(lower=0, upper=2, n=30))
print(res)
```

loggammaRob.control *Tuning parameters for loggammaRob*

Description

Tuning parameters for 'loggammaRob' for all four methods implemented.

Usage

```
loggammaRob.control(method="oneWL", tuning.rho=1.547647,
  tuning.psi=6.08, lower=-7, upper=7, n=201, max.it=750,
  refine.tol=1e-6, solve.tol=1e-7, nResample=100, bw=0.3,
  smooth=NULL, raf=c("NED","GKL","PWD","HD","SCHI2"),
  tau=1, subdivisions=1000, lambda.step=TRUE, sigma.step=TRUE,
  step=1, minw=0.04, nexp=1000, reparam=NULL, bootstrap=FALSE,
  bootstrap.lambda=NULL, qthreshold=0.9, nTML=2000, xmax=1e100,
  iter=1, pcut=0.997, compute.rd=FALSE,
  eps.outlier= function(nobs) 0.1 / nobs)
```

Arguments

method	character. The method to be used. See Details below.
tuning.rho	numeric. Tuning constant c1 for the Tau-estimator.
tuning.psi	numeric. Tuning constant c2 for the Tau-estimator.
lower	numeric. The lower limit for the search grid of the shape parameter.
upper	numeric. The upper limit for the search grid of the shape parameter.
n	numeric. The number of subdivisions for the search grid of the shape parameter.
max.it	numeric. Maximum number of iterations.
refine.tol	numeric. Relative convergence tolerance for the fully iterated best candidates.
solve.tol	numeric. Relative tolerance for inversion. Hence, this corresponds to solve.default()'s tol.
nResample	integer. Number of re-sampling candidates to be used to find the initial estimator. Currently defaults to 100 which works well in most situations.
bw	numeric. Bandwidth used in the Weighted Likelihood steps.
smooth	NULL or numeric. When not NULL the parameter bw is set to smooth times the square root of the starting value of the scale parameter.
raf	character. Residual adjustment function used in the Weighted Likelihood steps raf="NED": Negative Exponential Disparity RAF, raf="GKL": Generalized Kullback-Leibler Divergence Family with parameter tau (see below) RAF. raf="PWD": Power Divergence Family with parameter tau (see below) RAF. raf="HD": Hellinger Distance RAF, raf="SCHI2": Symmetric Chi-Squared Disparity RAF. Default value is "NED".

<code>tau</code>	parameter used when <code>raf</code> is equal to "PWD" or "GKL".
<code>subdivisions</code>	numeric. Number of subdivisions used in the approximation of the smoothed model density in the Weighted Likelihood steps.
<code>lambda.step</code>	logical.
<code>sigma.step</code>	logical.
<code>step</code>	integer. Number of steps to be performed when method is "oneWL" (only implemented for the functions for non censored data).
<code>minw</code>	numeric. A scalar in the interval [0,1]. When method is "oneWL" the weights smaller than <code>minw</code> are set to zero.
<code>nexp</code>	integer. When method is "oneWL" number of quantile points used in the approximation of the Expected Jacobian matrix.
<code>reparam</code>	list. When method is "oneWL" a reparametrization is possible for the "sigma" parameter. See function <code>sqrloggamma</code> for an example.
<code>bootstrap</code>	logical. To use <code>loggammarob</code> in <code>boot</code>
<code>bootstrap.lambda</code>	numeric. An initial estimates for the shape parameter. To use <code>loggammarob</code> in <code>boot</code>
<code>qthreshold</code>	numeric. A value in (0.5, 1] used for TQtau e TWQtau procedure. It is the quantile order to truncated the data on the right.
<code>nTML</code>	numeric. Number of elements to be considered in the grid for finding the cut points of the TML.
<code>xmax</code>	numeric. A threshold value for the log likelihood. Used for ML.
<code>iter</code>	numeric. Number of iterations to be performed. Only working for TML.
<code>pcut</code>	numeric. Fraction to determined the cut points of the TML.
<code>compute.rd</code>	logical. Indicating if robust distances (based on the MCD robust covariance estimator <code>covMcd</code>) are to be computed for the robust diagnostic plots. This may take some time to finish, particularly for large data sets, and can lead to singularity problems when there are factor explanatory variables (with many levels, or levels with "few" observations). Hence, is FALSE by default.
<code>eps.outlier</code>	limit on the robustness weight below which an observation is considered to be an outlier. Either a <code>numeric(1)</code> or a function that takes the number of observations as an argument. Used in <code>summary.loggammacens1mrob</code> .

Author(s)

C. Agostinelli, A. Marazzi, V.J. Yohai and A. Randriamiharisoa

References

- C. Agostinelli, A. Marazzi and V.J. Yohai (2015) Robust estimates of the generalized loggamma distribution, *Technometrics*, Volume 56, Issue 1, 2014. DOI: 10.1080/00401706.2013.818578
- C. Agostinelli, A. Marazzi, V.J. Yohai and A. Randriamiharisoa (2016) Robust Estimation of the Generalized Loggamma Model. The R Package `robustloggamma`. *Journal of Statistical Software*. Accepted.

C. Agostinelli, I. Locatelli, A. Marazzi and V.J. Yohai (2015) Robust estimators of accelerated failure time regression with generalized log-gamma errors. Submitted.

See Also

[loggammarob](#)

Examples

```
## Show the default settings:
str(loggammarob.control())
```

loggammarob.test	<i>Robust inference for the generalized loggamma model.</i>
------------------	---

Description

Robust Tests and confidence intervals for the parameters of the generalized loggamma model.

Usage

```
loggammarob.test(x, mu = NULL, sigma = NULL, lambda = NULL,
eta = NULL, type = "Wald", conf.level = 0.95, prob = 0.00001)
```

Arguments

x	list. An object of class 'loggammarob'
mu	numeric. Null value for the location parameter
sigma	numeric. Null value for the scale parameter
lambda	numeric. Null value for the shape parameter
eta	numeric. Null value for E(exp(X)) parameter
type	character. Type of inference, for now only Wald test is performed
conf.level	numeric. Level of the confidence interval.
prob	quantile order of the loggamma to be used in the numerical calculation of the expected Fisher Information.

Details

If no null values are provided, the function report the test for $\mu=0$, $\sigma=1$ and $\lambda=0$.

Value

An object of class 'htest' containing the following components:

statistic:	the value of the t-statistic.
parameter:	the degrees of freedom for the statistic.
p.value:	the p-value for the test.
conf.int:	a confidence interval for the parameter appropriate to the specified alternative hypothesis.
estimate:	the estimate of the parameter(s).
null.value:	the specified hypothesized value of the parameter.
alternative:	a character string describing the alternative hypothesis.
method:	a character string indicating what type of test was performed.
data.name:	a character string giving the name(s) of the data.

Author(s)

A. Marazzi, C. Agostinelli, V.J. Yohai and A. Randriamiharisoa

References

C. Agostinelli, A. Marazzi and V.J. Yohai (2015) Robust estimates of the generalized loggamma distribution, *Technometrics*, Volume 56, Issue 1, 2014. DOI: 10.1080/00401706.2013.818578

Agostinelli C., Marazzi A., Yohai V.J., Randriamiharisoa A. (2016). Robust Estimation of the Generalized Loggamma Model: The R Package robustloggamma. *Journal of Statistical Software*, 70(7), 1-21. doi:10.18637/jss.v070.i07

See Also

[loggammarob](#)

Examples

```
set.seed(1234)
x <- sort(rloggamma(n=80, lambda=1))
res <- loggammarob(x, control=loggammarob.control(lower=0, upper=2, n=30))
loggammarob.test(res, mu=0) #only location
loggammarob.test(res, mu=0, sigma=1) #location and scale
loggammarob.test(res, eta=1) #E(exp(X))
```

loggammarob.wilks *Robust Wilks test for generalized log gamma model.*

Description

Performs a robust Wilks test to check equality between scale and shape parameters of a generalized log gamma model.

Usage

```
loggammarob.wilks(x, thetainit = NULL, method = "L-BFGS-B",  
  lower = c(-Inf, 1e-04), upper = c(Inf, Inf), ...)
```

Arguments

x	list. An object of class 'loggammarob', typically created by loggammarob .
thetainit	NULL or numeric. A vector of length 2 to be used as initial values, first element corresponds to mu, second element to sigma/lambda under the Null Hypothesis that sigma is equal to lambda.
method	parameter passed to function optim .
lower	parameter passed to function optim .
upper	parameter passed to function optim .
...	further parameters passed to function optim .

Value

an object of class 'htest'.

Author(s)

C. Agostinelli, A. Marazzi, V.J. Yohai and A. Randriamiharisoa

References

C. Agostinelli, A. Marazzi and V.J. Yohai (2015). Robust estimates of the generalized loggamma distribution. *Technometrics*, Volume 56, Issue 1, 2014. doi:10.1080/00401706.2013.818578

See Also

[loggammarob.test](#) for robust (weighted) t-test on one or more parameters of the generalized loggamma model.

Examples

```
set.seed(1234)  
x <- sort(log(rgamma(n=30, shape=2, scale=2)))  
res <- loggammarob(x)  
loggammarob.wilks(res)
```

`sqrtloggamma`*A reparametrization for the sigma parameter in loggamma model.*

Description

A reparametrization for the sigma parameter in loggamma model. This is used in the function `loggamarob.control`.

Usage`sqrtloggamma`**Format**

The format is a list of 3 elements

`$ gam :function (sigma)``$ gaminv:function (gam)``$ delta :function (sigma)`**Details**

The object must be a length of dimension 3. Each component is a function. The first component `gam` performs the transformation for the parameter `sigma`; `gaminv` is the inverse function and `delta` is the derivative of the `gam` function wrt `sigma` to the -1 power.

Examples

```
str(sqrtloggamma)
set.seed(1234)
x <- sort(rloggamma(n=50, lambda=1))
res <- loggamarob(x, control=loggamarob.control(lower=0, upper=2,
n=30, reparam=sqrtloggamma))
print(res)
```

`summary.loggamarob`*Summary Method for "loggamarob" Objects*

Description

Summary method for R object of class "loggamarob" and `print` method for the summary object.

Usage

```
## S3 method for class 'loggammарob'
summary(object, p = NULL, conf.level = 0.95,
        prob = 1e-05, ...)
## S3 method for class 'summary.loggammарob'
print(x, digits = max(3, getOption("digits") - 3), ...)
```

Arguments

object	an R object of class loggammарob, typically created by loggammарob .
p	numeric. Values in the interval [0,1]. Quantile orders for which point estimation and confidence interval are require.
conf.level	numeric. A scalar or a vector of length 4+length(p). This is the confidence level used to construct confidence intervals for the four parameters mu, sigma, lambda and eta and for the quantiles.
prob	numeric. Value in the interval [0,1]. This is used to determine the interval of numerical integration in the evaluation of the asymptotic variance and covariance matrix. See details below.
x	an R object of class summary.loggammарob, typically resulting from <code>summary(loggammарob(...), ...)</code> .
digits	number of digits for printing, see digits in options .
...	potentially more arguments passed to methods.

Details

The prob argument determines the interval of the numerical integration in the evaluation of the asymptotic variance and covariance matrix with the following code `qloggamma(p=prob/2, lambda=lambda)` for the lower limit and `qloggamma(p=1-prob/2, lambda=lambda)` for the upper limit. Here lambda is the estimate.

Value

An object of class `summary.loggammарob`. A list that includes the following components:

muse	standard error for the mu estimate.
sigmase	standard error for the sigma estimate.
lambdase	standard error for the lambda estimate.
etase	standard error for the eta estimate.
muconf.int	confidence interval for the mu parameter.
sigmaconf.int	confidence interval for the sigma parameter.
lambdaconf.int	confidence interval for the lambda parameter.
etaconf.int	confidence interval for the eta parameter.

If p is not NULL then

q	quantiles estimate.
qse	standard error for the require quantiles estimate.
qconf.int	confidence interval for the require quantiles parameter.

Author(s)

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References

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Agostinelli C., Marazzi A., Yohai V.J., Randriamiharisoa A. (2016). Robust Estimation of the Generalized Loggamma Model: The R Package robustloggamma. *Journal of Statistical Software*, 70(7), 1-21. doi:10.18637/jss.v070.i07

See Also

[loggammарob](#)

Examples

```
set.seed(1234)
x <- rloggamma(n=50, lambda=1)
res <- loggammарob(x, control=loggammарob.control(lower=0, upper=2, n=30))
summary(res)
```

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