

Package ‘rcens’

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Type Package

Title Generate Sample Censoring

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Description Provides functions to generate censored samples of type I, II and III, from any random sample generator. It also supplies the option to create left and right censorship. Along with this, the generation of samples with interval censoring is in the testing phase, with two options of fixed length intervals and random lengths.

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URL <https://github.com/dlsaavedra/rcens>

BugReports <https://github.com/dlsaavedra/rcens/issues>

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rcensI *Generate interval censoring sample*

Description

Generator of interval censored samples where the length of interval is random, given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. Generator sample of distribution C (censoring) with parameters appended by the list param_C In which, you can control the desired censorship percentage.

Usage

```
rcensI(
  rdistrX,
  rdistrC,
  param_X,
  param_C,
  n = 10000,
  epsilon = 0.5,
  n_mc = 10000,
  theta = 1,
  verbose = FALSE
)
```

Arguments

rdistrX	sample generator of distribution X. First argument number of samples, next arguments in param_X.
rdistrC	sample generator of distribution C. First argument number of samples, next arguments in param_C.
param_X	list with parameters of rdistrX function.
param_C	list with parameters of rdistrC function, one of these parameters should be "lambda", this will be the searched parameter.
n	number of sample to create.
epsilon	Parameter to estimate the number of visit (in [0,1]), shrink it only if the algorithm takes too long
n_mc	number of sample use to estimate the moments of C, greater n_mc more accuracy.
theta	Desired censoring percentage
verbose	if TRUE print a censoring percentage of new created database.

Value

A list with sample data information:

sample_censored	vector of censored sample
sample_uncensored	vector of uncensored sample (original)
censored_indicator	vector of 1 and 0 indicating whether the i-th sample is censored 1:= no censored, 0:= censored
n_censored	number of censored samples

Author(s)

Daniel Saavedra Morales

See Also

[rcensT1](#) for generate censorship sample type I.
[rcensT2](#) for generate censorship sample type II.
[rcensT3](#) for generate censorship sample type III
[rcensIfix](#) for generate interval censoring sample with fix length interval

Examples

```

#Example Exponential - Uniform

Data_I = rcensI(rdistrX = rexp, rdistrC = runif,
               param_X = list("rate" = 2),
               param_C = list("min" = 0, "max" = 1),
               n = 1e02, theta = .9)

## Example with plot in examples_plot/Example_rcensI_plot.R

```

rcensIfix *Generate interval censoring sample (Fix)*

Description

Generator of interval censored samples where the length of interval is fixed, given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. In which, you can control the desired censorship percentage.

Usage

```

rcensIfix(
  rdistrX,
  param_X,
  interval_length,
  n = 10000,
  theta = 1,
  verbose = FALSE
)

```

Arguments

rdistrX	sample generator of distribution X. First argument number of samples, next arguments in param_X.
param_X	list with parameters of rdistrX function.
interval_length	length of interval
n	number of sample to create.
theta	Desired censoring percentage
verbose	if TRUE print a censoring percentage of new created database.

Value

A list with sample data information:

sample_censored	vector of censored sample
sample_uncensored	vector of uncensored sample (original)
censored_indicator	vector of 1 and 0 indicating whether the i-th sample is censored 1:= no censored, 0:= censored
n_censored	number of censored samples

Author(s)

Daniel Saavedra Morales

See Also

[rcensT1](#) for generate censorship sample type I.
[rcensT2](#) for generate censorship sample type II.
[rcensT3](#) for generate censorship sample type III
[rcensI](#) for generate interval censoring sample with random length interval

Examples

```
#Example Exponential - Uniform

Data>Ifix = rcensIfix(rdistrX = rexp, interval_length = 2,
                    param_X = list("rate" = .5),
                    n = 1e02, theta = .9)

## Example with plot in examples_plot/Example_rcensIfix_plot.R
```

rcensT1 *Generate Censoring Sample, Type I*

Description

Generator of censored samples type I with right or left censoring, given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. In which, you can control the censorship time or the desired censorship percentage.

Usage

```
rcensT1(
  rdistrX,
  param_X,
  qdistrX = NULL,
  n = 10000,
  t_censored = -1,
  theta = 0.5,
  verbose = FALSE,
  right = TRUE
)
```

Arguments

rdistrX	sample generator of distribution X. First argument number of samples, next arguments in param_X.
param_X	list with parameters of rdistrX function.
qdistrX	quantile function of X.
n	number of sample to create.
t_censored	time level censored.
theta	Desired censoring percentage.
verbose	if TRUE print a censoring percentage of new created database.
right	if TRUE create right-censored data, else create left-censored

Value

A list with sample data information:

sample_censored	vector of censored sample
sample_uncensored	vector of uncensored sample (original)
censored_indicator	vector of 1 and 0 indicating whether the i-th sample is censored 1:= no censored, 0:= censored
censored_time	vector of censorship time
n_censored	number of censored samples

Author(s)

Daniel Saavedra Morales

See Also

[rcensT2](#) for generate censorship sample type II.
[rcensT3](#) for generate censorship sample type III
[rcensI](#) for generate interval censoring sample with random length interval
[rcensIfix](#) for generate interval censoring sample with fix length interval

Examples

```
## Example Exponential
## time censored

Data_T1 = rcensT1(rdistrX = rexp, param_X = list("rate" = 2),
                 n = 1e02, t_censored = 1)

## time censored estimate with desired censoring percentage.

Data_T1 = rcensT1(rdistrX = rexp, param_X = list("rate" = 2),
                 qdistrX = qexp, n = 1e02, theta = .8)

## Example with plot in examples_plot/Example_rcensT1_plot.R
```

rcensT2

Generate Censoring Sample, Type II

Description

Generator of censored samples type II with right or left censoring, given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. In which, you can control the number of censored sample or the desired censorship percentage.

Usage

```
rcensT2(
  rdistrX,
  param_X,
  n = 10000,
  m_censored = -1,
  theta = 0.5,
  verbose = FALSE,
  right = TRUE
)
```

Arguments

<code>rdistrX</code>	sample generator of distribution X . \ First argument number of samples, next arguments in <code>param_X</code> .
<code>param_X</code>	list with parameters of <code>rdistrX</code> function.
<code>n</code>	number of sample to create.
<code>m_censored</code>	number of sample censored. $m_censored < n$. \ If $m_censored \leq n$, <code>m_censored</code> is estimate with the desired censoring percentage.
<code>theta</code>	Desired censoring percentage.
<code>verbose</code>	if TRUE print a censoring percentage of new created database.
<code>right</code>	if TRUE create right-censored data, else create left-censored

Value

A list with sample data information:

<code>sample_censored</code>	vector of censored sample
<code>sample_uncensored</code>	vector of uncensored sample (original)
<code>censored_indicator</code>	vector of 1 and 0 indicating whether the i -th sample is censored 1:= no censored, 0:= censored
<code>censored_time</code>	vector of censorship time
<code>n_censored</code>	number of censored samples

Author(s)

Daniel Saavedra Morales

See Also

[rcensT1](#) for generate censorship sample type I.
[rcensT3](#) for generate censorship sample type III
[rcensI](#) for generate interval censoring sample with random length interval
[rcensIfix](#) for generate interval censoring sample with fix length interval

Examples

```
##Example Exponential

## Number of sample censored
Data_T2 = rcensT2(rdistrX = rexp, param_X = list("rate" = 2), n = 1e02, m_censored = 9)

## Number of censored sample estimate with desired censoring percentage.
Data_T2 = rcensT2(rdistrX = rexp, param_X = list("rate" = 2), n = 1e02, theta = .8)

## Example with plot in examples_plot/Example_rcensT2_plot.R
```

rcensT3

*Generate Censoring Sample, Type III (Random)***Description**

Generator of censored samples type III with right or left censoring, given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. Also accumulate function of distribution and generator sample of distribution C (censoring) with parameters appended by the list param_C In which, you can control the desired censorship percentage.

Usage

```
rcensT3(
  rdistrX,
  pdistrC,
  rdistrC,
  param_X,
  param_C,
  n = 10000,
  theta = 0.5,
  n_mc = 10000,
  lambda_tol = c(1e-06, 10000),
  verbose = FALSE,
  right = TRUE
)
```

Arguments

rdistrX	sample generator of distribution X. First argument number of samples, next arguments in param_X.
pdistrC	function distribution of C. First argument probabilities, next arguments in param_C.
rdistrC	sample generator of distribution C. First argument number of samples, next arguments in param_C.
param_X	list with parameters of rdistrX function.
param_C	list with parameters of rdistrC function, one of these parameters should be "lambda", this will be the searched parameter.
n	number of sample to create.
theta	Desired censoring percentage
n_mc	number of sample use in Monte Carlo integration, greater n_mc more accuracy.
lambda_tol	lowest and uppest value where live the search parameter lambda.
verbose	if TRUE print a censoring percentage of new created database.
right	if TRUE create right-censored data, else create left-censored

rcensT3

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Value

A list with sample data information:

lambda	searched censoring distribution parameter.
sample_censored	vector of censored sample.
sample_uncensored	vector of uncensored sample (original).
censored_indicator	vector of 1 and 0 indicating whether the i-th sample is censored. 1:= no censored, 0:= censored
censored_time	vector of censorship time.
n_censored	number of censored samples.

Author(s)

Daniel Saavedra Morales

See Also

[rcensT1](#) for generate censorship sample type I.
[rcensT2](#) for generate censorship sample type II
[rcensI](#) for generate interval censoring sample with random length interval
[rcensIfix](#) for generate interval censoring sample with fix length interval

Examples

```
#Example Exponential - Uniform

Data_T3 = rcensT3(rdistrX = rexp, pdistrC = punif, rdistrC = runif,
  param_X = list("rate" = 2),
  param_C = list("min" = 0, "max" = "lambda"),
  n = 1e02, theta = .9, right = TRUE)

Data_T3 = rcensT3(rdistrX = rexp, pdistrC = punif, rdistrC = runif,
  param_X = list("rate" = 2),
  param_C = list("min" = 0, "max" = "lambda"),
  n = 1e02, theta = .1, right = FALSE)

## Example with plot in examples_plot/Example_rcensT3_plot.R
```

rcuref

Title Generate Sample with Cure Fraction

Description

Generator Sample with Cure Fraction, given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. Also the proportion of cure desired p.

Usage

```
rcuref(rdistrX, param_X, n = 10000, p = 0.5)
```

Arguments

rdistrX	sample generator of distribution X. First argument number of samples, next arguments in param_X.
param_X	list with parameters of rdistrX function.
n	number of sample to create.
p	cure fraction

Value

A list with sample data information:

data_cf	vector of cure fraction sample.
cure_list	vector of 1 and 0 indicating whether the i-th sample is cured. 1:= cure , 0:= no cure
cure_fraction	cure fraction used to create de sample.

Author(s)

Daniel Saavedra Morales

Examples

```
#Example Exponential Cure Fraction p = 0.5

Data = rcuref(rdistrX = rexp, param_X = list("rate" = 1),
             n = 1000, p = 0.5)
```

rcurefT3

Title Generate Sample with Cure Fraction and Random Censoring

Description

Generator Sample with Cure Fraction, Random Censoring. Given a generator of samples of the distribution X (rdistrX) with parameters appended by the list param_X. Also accumulate function of distribution and generator sample of distribution C (censoring) with parameters appended by the list param_C In which, you can control the desired censorship percentage.

Note: cure fraction (p) must be less than desired censorship percentage.

Usage

```
rcurefT3(
  rdistrX,
  pdistrC,
  rdistrC,
  param_X,
  param_C,
  p = 0.1,
  n = 10000,
  theta = 0.5,
  n_mc = 10000,
  lambda_tol = c(1e-06, 10000),
  verbose = FALSE,
  right = TRUE
)
```

Arguments

<code>rdistrX</code>	sample generator of distribution X. First argument number of samples, next arguments in <code>param_X</code> .
<code>pdistrC</code>	function distribution of C. First argument probabilities, next arguments in <code>param_C</code> .
<code>rdistrC</code>	sample generator of distribution C. First argument number of samples, next arguments in <code>param_C</code> .
<code>param_X</code>	list with parameters of <code>rdistrX</code> function.
<code>param_C</code>	list with parameters of <code>rdistrC</code> function, one of these parameters should be "lambda", this will be the searched parameter.
<code>p</code>	cure fraction
<code>n</code>	number of sample to create.
<code>theta</code>	Desired censoring percentage
<code>n_mc</code>	number of sample use in Monte Carlo integration, greater <code>n_mc</code> more accuracy.
<code>lambda_tol</code>	lowest and uppest value where live the search parameter lambda.
<code>verbose</code>	if TRUE print a censoring percentage of new created database.
<code>right</code>	if TRUE create right-censored data, else create left-censored

Value

A list with sample data information:

<code>lambda</code>	searched censoring distribution parameter.
<code>sample_censored</code>	vector of censored sample.
<code>sample_uncensored</code>	vector of uncensored sample (original).
<code>censored_indicator</code>	vector of 1 and 0 indicating whether the i-th sample is censored. 1:= no censored, 0:= censored

censored_time	vector of censorship time.
n_censored	number of censored samples.
cure_list	vector of 1 and 0 indicating whether the i-th sample is cured. 1:= cure , 0:= no cure
cure_fraction	cure fraction used to create de sample.

Author(s)

Daniel Saavedra Morales

See Also

[rcuref](#) Generate Sample with Cure Fraction.

Examples

```
#Example Exponential - Uniform

Data_T3 = rcurefT3(rdistrX = rexp, pdistrC = punif, rdistrC = runif,
                  param_X = list("rate" = 2),
                  param_C = list("min" = 0, "max" = "lambda"),
                  n = 1e02, theta = .9, p = 0.2)

## Example with plot in examples_plot/Example_rcurefT3_plot.R
```

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