

Package ‘sampfing’

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Depends R (>= 1.5)

Title Sampford sampling (w/o replacement and unequal probabilities)

Description Implements a modified version of the Sampford sampling algorithm. Given a quantity assigned to each unit in the population, samples are drawn with probability proportional to the product of the quantities of the units included in the sample.

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 sample

Random Sampling: the Sampford Algorithm

Description

sample implements the Sampford algorithm to obtain a sample without replacement and with unequal probabilities. The probability of the sample is known a priori.

Usage

```
sample(x, size, prob = NULL)
```

Arguments

x	Either a (numeric, complex, character or logical) vector of more than one element from which to choose, or a positive integer.
size	A positive integer giving the number of items to choose.
prob	A vector of weights for obtaining the elements of the vector being sampled.

Details

If x has length 1, sampling takes place from 1 : x.

The prob argument gives a vector of weights for obtaining the elements of the vector being sampled. They need not sum to one, but they should be nonnegative and, after normalizing, less than 1/size. The number of nonzero weights must be at least size.

The Sampford algorithm draws the first unit i with probability proportional to prob, and subsequent units with probabilities proportional to $\text{prob}/(1-\text{size}*\text{prob}[i])$ with replacement. As soon as a unit is repeated, the entire sample is rejected and the process is restarted. Thus a sample without replacement is obtained.

The algorithm produces a sample s , subset of x of size n , with probability proportional to

$$\Pr[s] \propto \left(1 - \sum z_i\right) \prod \frac{z_i}{1 - n z_i}$$

$(1 - \text{Sum } z[i]) \text{ Prod}(z[i]/(1-n*z[i]))$ where z_i is the i -th element of prob, that is, $\text{prob}[i]$; and both the sum and the product extend over the drawn units, $i \in s$.

Value

A vector, which contains the sampled units from x, or indices if x is an integer.

Author(s)

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References

Cochran, W.G. (1977) *Sampling techniques*, John Wiley and Sons.

Sampford, M.R. (1967) On sampling without replacement with unequal probabilities of selection, *Biometrika* 54:499-513.

See Also

[samprop](#)

Examples

```
library(sampfling)
sampfle(10, 3, 1:10)
sampfle(c("a","b","c"), 2, c(0.3,0.3,0.4))
```

samprop

Random Sampling: the Sampford Algorithm

Description

samprop implements a modified version of the Sampford algorithm to obtain a sample without replacement and with unequal probabilities. The probability of the sample is proportional to the product of the probabilities of units contained in the sample.

Usage

```
samprop(x, size, prob = NULL)
```

Arguments

x	Either a (numeric, complex, character or logical) vector of more than one element from which to choose, or a positive integer.
size	A positive integer giving the number of items to choose.
prob	A vector of weights for obtaining the elements of the vector being sampled.

Details

If x has length 1, sampling takes place from 1 : x.

The prob argument gives a vector of weights for obtaining the elements of the vector being sampled. They need not sum to one, but they should be nonnegative. The number of nonzero weights must be at least size. Each weight cannot exceed a certain quantity, in order to satisfy Sampford algorithm requirements (see [sampfle](#)).

This procedure draws a sample without replacement, which probability is proportional to the product of weights of units contained in the sample.

Value

A vector of size `size`, which contains the sampled units from `x`, or indices if `x` is an integer.

Author(s)

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References

Cochran, W.G. (1977) *Sampling techniques*, John Wiley and Sons.

Sampford, M.R. (1967) On sampling without replacement with unequal probabilities of selection, *Biometrika* 54:499-513.

See Also

[sample](#)

Examples

```
library(sampfling)
samprop(10, 3, 1:10)
samprop(c("a", "b", "c"), 2, c(0.3, 0.3, 0.4))
```

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