Package 'SunterSampling'

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Type Package

Title Sunter's sampling design

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Author Alessandro Barbiero, Giancarlo Manzi

Maintainer alessandro.barbiero <alessandro.barbiero@unimi.it>

Description Functions for drawing samples according to Sunter's sampling design, and for computing first and second order inclusion probabilities

License GPL

LazyLoad yes

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`SunterSampling-package`
Sunter sampling

Description

The package provides functions for drawing samples according to Sunter's sampling design, which is an approximate probability proportional to size design, and for computing its first and second order inclusion probabilities

Details

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Type:	Package
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Date:	2012-05-02
License:	GPL
LazyLoad:	yes

Author(s)

Alessandro Barbiero <alessandro.barbiero@unimi.it>, Giancarlo Manzi <giancarlo.manzi@unimi.it>

Maintainer: alessandro.barbiero@unimi.it

References

C-E. Sarndal, B. Swensson, J. Wretman: Model Assisted Survey Sampling, Springer, New York, 1992 (pp.93-96)

See Also

sunter, sunterpi, sunterpi2

Examples

```
# from Sarndal et al. (1992)
x<-c(40,25,20,10,5)
n<-2
pi<-sunterpi(x,n) # first order inclusion probabilities
pi2<-sunterpi2(x,n) # second order inclusion probabilities
apply(pi2,2,sum) # they should be equal to...
n*pi # OK!
sunter(x,n) # sample drawn according to Sunter's design
```

sunter *Sunter sampling*

Description

The function uses the Sunter's method to select a sample of units (unequal probabilities, without replacement, fixed sample size).

Usage

```
sunter(x, n)
```

Arguments

x	the vector of values of the auxiliary variable (measure of size)
n	the sample size

Value

a vector of size n that contains the selected units

Note

A special thank to Hugo Andres Gutierrez Rojas for a fruitful exchange of ideas on Sunter's sampling design. Please note that the Sunter's sampling design here implemented corresponds to the version fully described in the reference below.

Author(s)

Alessandro Barbiero, Giancarlo Manzi

References

C-E. Sarndal, B. Swensson, J. Wretman: Model Assisted Survey Sampling, Springer, New York, 1992

See Also

sunterpi, sunterpi2

Examples

```
# from Sarndal et al. (1992)
x<-c(40,25,20,10,5)
n<-2
sunter(x,n)
```

`sunterpi` *Inclusion probabilities for Sunter sampling*

Description

The function computes the inclusion probabilities for Sunter sampling.

Usage

```
sunterpi(x, n)
```

Arguments

`x`	the vector of values of the auxiliary variable (measure of size)
`n`	the sample size

Details

Citing the reference, "For the most part of the population, Sunter's scheme gives the inclusion probability π_k strictly proportional to x_k. For a small portion of the population, corresponding to the elements with the smallest x_k-values, equal, rather than x_k-proportional, inclusion probability is applied to gain simplicity."

Value

a vector that contains the first-order inclusion probabilities for each unit k in the population; N is the population size.

Author(s)

Alessandro Barbiero, Giancarlo Manzi

References

C-E. Sarndal, B. Swensson, J. Wretman: Model Assisted Survey Sampling, Springer, New York, 1992

See Also

`sunter`, `sunterpi2`

Examples

```
# Ex.1 from Sarndal et al. (1992)
x<-c(40,25,20,10,5)
n<-2
sunterpi(x,n)
# note that the inclusion probabilities are not exactly proportional
# to the measures of size
n*x/sum(x)

# Ex.2
# set the population size
N<-100
set.seed(1)
# build a vector of measures of size
x<-rnorm(N,100,25)
sort(x)
# set the sample size
n<-10
# inclusion probabilities for Sunter's sampling
pi<-sunterpi(x,n)
pi
# theoretical inclusion probabilities
pik<-n*x/sum(x)
pik
# note the difference between actual and theoretical inclusion probabilities
sort(pi)
sort(pik)
```

`sunterpi2` *Joint inclusion probabilities for Sunter sampling*

Description

The function computes the joint (second-order) inclusion probabilities for Sunter sampling.

Usage

```
sunterpi2(x, n)
```

Arguments

`x`	the vector of values of the auxiliary variable (measure of size)
`n`	the sample size

Value

Returns a NxN matrix of the following form: the main diagonal contains the first-order inclusion probabilities for each unit k in the population; elements (k, l) are the joint inclusion probabilities of units k and l, with k not equal to l. N is the population size.

Author(s)

Alessandro Barbiero, Giancarlo Manzi

References

C-E. Sarndal, B. Swensson, J. Wretman: Model Assisted Survey Sampling, Springer, New York, 1992

See Also

sunter, sunterpi

Examples

```
# from Sarndal et al. (1992)
x<-c(40,25,20,10,5)
n<-2
sunterpi2(x,n)
```

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