

Package ‘prnsamplr’

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Type Package

Title Permanent Random Number Sampling

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Description Survey sampling using permanent random numbers (PRN's). A solution to the problem of unknown overlap between survey samples, which leads to a low precision in estimates when the survey is repeated or combined with other surveys. The PRN solution is to supply the $U(0, 1)$ random numbers to the sampling procedure, instead of having the sampling procedure generate them. In Lindblom (2014) <doi:10.2478/jos-2014-0047>, and therein cited articles, it is shown how this is carried out and how it improves the estimates. This package supports two common fixed-size sampling procedures (simple random sampling and probability-proportional-to-size sampling) and includes a function for transforming the PRN's in order to control the sample overlap.

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Encoding UTF-8

RoxygenNote 6.1.1

Depends R (>= 2.10)

Imports stats

LazyData true

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ExampleData	<i>ExampleData</i>
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Description

Artificial dataset to be used with `samp`.

Usage

```
data("ExampleData")
```

Format

A data frame with 40000 observations on the following 6 variables.

`stratum` a character vector

`id` a numeric vector

`npopul` a numeric vector

`nsample` a numeric vector

`rands` a numeric vector

`sizeM` a numeric vector

Examples

```
data(ExampleData)
```

pps	<i>Stratified probability-proportional-to-size sampling</i>
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Description

Stratified probability-proportional-to-size (PPS) sampling using permanent random numbers. Can also be used for non-stratified PPS using a dummy `stratum` taking the same value for each object.

Usage

```
pps(df, stratid, nsamp, prn, size)
```

Arguments

df	Data frame containing the elements to sample from.
stratid	Variable in df containing the strata.
nsamp	Variable in df containing the sample sizes.
prn	Variable in df containing the permanent random numbers.
size	Variable in df containing the size measure.

Value

Copy of the input data frame together with the boolean variable `sampled`, as well as a numeric variable `lambda` containing the estimated first-order inclusion probabilities.

See Also

[samp](#), [srs](#), [transformprn](#).

Examples

```
dfOut <- pps(df=ExampleData,
             nsamp="nsample",
             stratid="stratum",
             prn="rands",
             size="sizeM")
```

samp	<i>Stratified permanent random number sampling</i>
------	--

Description

Wrapper for stratified simple random sampling (SRS) and probability-proportional-to-size (PPS) sampling using permanent random numbers. Can also be used for non-stratified sampling using a dummy `stratum` taking the same value for each object.

Usage

```
samp(method, df, ...)
```

Arguments

method	pps or srs.
df	Data frame containing the elements to sample from.
...	Further method-specific arguments.

Value

Copy of the input data frame together with the boolean variable `sampled`, as well as a numeric variable `lambda` containing the estimated first-order inclusion probabilities when PPS is used.

See Also

[srs](#), [pps](#), [transformprn](#).

Examples

```
dfOut <- samp(method=pps,
              df=ExampleData,
              nsamp="nsample",
              stratid="stratum",
              prn="rands",
              size="sizeM")
```

```
dfOut <- samp(method=srs,
              df=ExampleData,
              nsamp="nsample",
              stratid="stratum",
              prn="rands")
```

srs

Stratified simple random sampling

Description

Stratified simple random sampling (SRS) using permanent random numbers. Can also be used for non-stratified SRS using a dummy stratum taking the same value for each object.

Usage

```
srs(df, stratid, nsamp, prn)
```

Arguments

df	Data frame containing the elements to sample from.
stratid	Variable in df containing the strata.
nsamp	Variable in df containing the sample sizes.
prn	Variable in df containing the permanent random numbers.

Value

Copy of the input data frame together with the boolean variable sampled.

See Also

[samp](#), [pps](#), [transformprn](#).

Examples

```
dfOut <- srs(df=ExampleData,
             nsamp="nsample",
             stratid="stratum",
             prn="rands")
```

transformprn	<i>Permanent random number transformation</i>
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Description

Transformation of the permanent random numbers used in the sampling procedure, to control the overlap between samples, and thus control the sample coordination. The method used is specified in Lindblom and Teterukovsky (2007).

Usage

```
transformprn(df, prn, direction, start)
```

Arguments

df	Data frame containing the elements to sample from.
prn	Variable in df containing the permanent random numbers.
direction	"U" or "R" for upwards, or to the right on the real-number line. "D" or "L" for downwards, or to the left on the real-number line.
start	Starting point for the transformation.

Value

Copy of the input data frame together with the numeric variable `prn.old` containing the non-transformed permanent random numbers, as well as the numeric variable `prn` containing the transformed permanent random numbers.

References

Lindblom, A. and Teterukovsky, A. (2007) *Coordination of Stratified Pareto pps Samples and Stratified Simple Random Samples at Statistics Sweden*.

See Also

[samp](#), [srs](#), [pps](#).

Examples

```
dfOut <- transformprn(df=ExampleData, prn="rands", direction="U", start=0.2)
```

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