Package 'audit'

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Title Bounds for Accounting Populations

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Description Two Bayesian methods for Accounting Populations

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R topics documented:

`simulateD` *Simulating the Total Error in the Accounts*

Description

In a population of accounts each unit has a book value, y, (known) and a true but unknown value, x. For a random sample of accounts the true values are observed. Using the posterior from a stepwise Bayes model this simulates possible values of D, the sum of the differences between the the book values and the true values. The 0.95 quantile of this posterior will yield an approximate 95 upper confidence bound for T for most populations and will be less conservative than the Stringer bound.

Usage

```
simulateD(ysmp,xsmp,yunsmp ,n,pgt,pwa,R)
```

Arguments

ysmp	numeric vector of book values for the units in the sample
xsmp	the corresponding true values for the units in the sample
yunsmp	numeric vector of the book values for the units not in the sample
n	an integer which is the size of the sample
pgt	numeric vector of prior guesses for the taints
pwa	weights corresponding to the taints that appear in the posterior
R	an integer which is the number of simulated values of D returned

Details

For a given unit (y-x)/x is its taint. pgt is a prior guess for the possible taints in the population. pwt specifies how much weight the prior guess pgt should have in the posterior. When all the taints are assumed to be nonnegative then the Stringer bound is often used. Setting both pqt and pwt equal to one yields a slightly shorter bound than that of Stringer's.

Value

A vector of lenght R containing simulated values of D

References

Statistical models and analysis in auditing, Statistical Science (1989) *A stepwise Bayes justification for some Stringer type bounds in auditing problems* Technical report available at http://www.stat.umn.edu/~glen/papers/

Examples

```
y <- rgamma(500,5)
x <- y
dum <- sample(1:500,50)
x[dum] <- x[dum]*runif(50,.05,0.5)
smp <- sample(1:500,40)
quantile(simulateD(y[smp],x[smp],y[-smp],40,1,1,1000),0.95)
```

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simulateT *Simulating the Total Number of Accounts in Error*

Description

Considered a stratified finite population of accounts where each account is classified as either acceptable or in error. Based on a stratified random sample of accounts an auditor is required to give an upper 95 the population that are in error. Given the sample this uses the posterior distribution from a simple hierarchical Bayes model to simulate possible values for T. The 0.95 quantile for this posterior will be an approximate 95 populations.

Usage

```
simulateT(smp,n,N,grd,R)
```

Arguments

smp	numeric vector of the number of accounts in error in each strata in the sample
n	numeric vector of the number of accounts sampled in each strata in the population
N	numeric vector of the total number of accounts in each strata in the population
grd	numeric vector of values usually taken to be seq(0.0001,0.1499,length = 11)
R	an integer which is the number of simulated values of T returned

Value

A vector of length R containing simulated values of T

References

Inference for a stratified finite population with a dichotomous characteristic, Technical report available at http://www.stat.umn.edu/~glen/papers/

Examples

```
grd <- seq(0.0001,0.15,length = 11)
smp <- c(2,1,0)
n <- c(75,50,25)
N <- c(5000,3000,2000)
as.numeric(quantile(simulateT(smp,n,N,grd,40000),0.95))
```

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