Package 'ssfit'

October 14, 2022

Type Package

Title Fitting of Parametric Models using Summary Statistics

Version 1.2

Date 2022-06-06

Author Christiana Kartsonaki

Maintainer Christiana Kartsonaki <christiana.kartsonaki@gmail.com>

Description Fits complex parametric models using the method proposed by Cox and Kartsonaki (2012) without likelihoods.

Imports survey

License GPL (>= 2)

NeedsCompilation no

Repository CRAN

Date/Publication 2022-06-06 23:10:05 UTC

R topics documented:

`ssfit-package` *Fitting of Parametric Models using Summary Statistics*

Description

Fits complex parametric models without likelihoods, using the method proposed by Cox and Kartsonaki (2012).

Details

Package:	ssfit
Type:	Package
Version:	1.2
Date:	2022-06-06
Depends: survey License:	GPL (>= 2)

See `fit.model`.

Author(s)

Christiana Kartsonaki

Maintainer: Christiana Kartsonaki <christiana.kartsonaki@gmail.com>

References

Cox, D. R. and Kartsonaki, C. (2012). The fitting of complex parametric models. *Biometrika*, **99** (3): 741–747.

`fit.model` *Fitting of parametric models using summary statistics*

Description

Fits complex parametric models with intractable likelihood using the method proposed by Cox and Kartsonaki (2012).

Usage

```
fit.model(p, q, n, r, starting_values, h_vector, data_true, sim_data, features, n_iter,
print_results = TRUE, variances = TRUE)
```

Arguments

`p`	Number of parameters to be estimated.
`q`	Number of features / summary statistics.
`n`	Sample size. Usually equal to the number of observations in the data (`data_true`).
`r`	Number of simulations to be run at each design point, in each iteration.
`starting_values`	A vector of starting values for the parameter vector.
`h_vector`	A vector of spacings `h`.
`data_true`	The dataset.
`sim_data`	A function which simulates data using the model to be fitted.
`features`	A function which calculates the features / summary statistics.

n_iter	Number of iterations of the algorithm to be performed.
print_results	If TRUE, the estimates of the parameters are printed at each iteration.
variances	If TRUE, the covariance matrix of the estimates of the parameters at each iteration are saved into a list. If FALSE, only that of the estimates obtained at the last iteration is obtained.

Details

Function sim_data should simulate from the model, taking as arguments the sample size and the parameter vector. Function features must take as an argument the simulated data generated by sim_data and calculate the features / summary statistics. The format of the dataset and the simulated data should be the same and should match the format needed by the function features. Function features must return a vector of length q.

Value

estimates	The estimates of the parameters.
var_estimates	The covariance matrix of the final estimates.
L	The matrix of coefficients L.
sigma	The covariance matrix of the features.
zbar	The average values of the simulated features at each design point.
z_D	The values of the features calculated from the data.
ybar	The linear combinations of the simulated features at each design point.
y_D	The linear combinations of the features calculated from the data.

Author(s)

Christiana Kartsonaki

References

Cox, D. R. and Kartsonaki, C. (2012). The fitting of complex parametric models. *Biometrika*, **99** (3): 741–747.

Examples

```
# estimate the mean of a N(2, 1) distribution

sim_function <- function(n, mu) {
rnorm(n, unlist(mu), 1)
}

features_function <- function(data) {
a <- median(data)
b <- sum(data) - (min(data) + max(data))
c <- (min(data) + max(data)) / 2
return(c(a, b, c))
}
```

```
fit1 <- fit.model(p = 1, q = 3, n = 100, r = 100, starting_values = 5, h_vector = 0.1,
data_true = rnorm(100, 2, 1), sim_data = sim_function, features = features_function,
n_iter = 50, print_results = TRUE, variances = TRUE)
```

Index