Package 'SpatialRoMLE'

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Type Package

Title Robust Maximum Likelihood Estimation for Spatial Error Model

Version 0.1.0

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Description Provides robust estimation for spatial error model to presence of outliers in the residuals. The classical estimation methods can be influenced by the presence of outliers in the data. We proposed a robust estimation approach based on the robustified likelihood equations for spatial error model (Vural Yildirim & Yeliz Mert Kantar (2020): Robust estimation approach for spatial error model, Journal of Statistical Computation and Simulation, <doi:10.1080/00949655.2020.1740223>).

License GPL-3

Encoding UTF-8

LazyData true

RoxygenNote 7.1.0

Depends R (>= 2.10)

NeedsCompilation no

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Contents

IPS_coefs   *Initial coefficients of individual pension system data*

Description

Initial coefficients of individual pension system data were obtained by MLE.

Usage

```
IPS_coefs
```

Format

A list with 10 values, which are:

(Intercept) intercept

Labor_Rate labor rate

Unemployment_Rate unemployment rate

Sex_Ratio sex ratio

Urbanization_Rate urbanization rate

Deposit_Rate deposit rate

Illiteracy_Rate illiteracy rate

HDI human development index

lambda spatial autocorrelation parameter

s2 variance

IPS_data   *The individual pension system data of Turkey*

Description

This is individual pension system data of Turkey for analysing spatial error model.

Usage

```
IPS_data
```

Format

A list with 10 variables, which are:

ID provinces ID

Province provinces names

RPIPS participant rate of individual pension system

Labor_Rate labor rate

Unemployment_Rate unemployment rate

Sex_Ratio sex ratio

Urbanization_Rate urbanization rate

Deposit_Rate deposit rate

Illiteracy_Rate illiteracy rate

HDI human development index

RoMLE.error   *Robust Maximum Likelihood Estimation for Spatial Error Model*

Description

This package provides robust maximum likelihood estimation for spatial error model.

Usage

```
RoMLE.error(
  initial.beta,
  initial.s2,
  initial.lambda,
  W,
  y,
  x,
  phi.function,
  converge.v,
  iter,
  print.values
)
```

Arguments

initial.beta	initial value of coefficients
initial.s2	initial value of varaince
initial.lambda	initial value of autocorrelation parameters
W	a symmetric weight matrix
y	dependent variable

x	independent variables
phi.function	a robust m-estimator function, should be set as 1 for Cauchy, 2 for Welsch, 3 for Insha and 4 for Logistic
converge.v	converge value for fisher scoring algorithm, can be set as 1e-04
iter	iteration number for fisher scoring algorithm, set by users (e.g. 100)
print.values	printing estimated values for each step until converge, should be set TRUE or FALSE

Value

coefficients, lambda, s2, Phi

References

Yildirim, V. and Kantar, Y.M. (2020). Robust estimation of spatial error model. in Journal of Statistical Computation and Simulation https://doi.org/10.1080/00949655.2020.1740223

Yildirim, V., Mert Kantar, Y. (2019). Spatial Statistical Analysis of Participants in The Individual Pension System of Turkey. Eskisehir Teknik Universitesi Bilim Ve Teknoloji Dergisi B - Teorik Bilimler, 7(2), 184-194 https://doi.org/10.20290/estubtdb.518706

Examples

```
#spdep library can be used to create a weight matrix from listw
#require(spdep)
#W <- as(listw, "CsparseMatrix")

#example 1
data(TRQWM)
data(unemployment_data)
data(unemployment_coefs)

y <- unemployment_data$unemployment
x <- unemployment_data$urbanization

#initial values was taken from MLE
initial.beta <- unemployment_coefs[1:2,2]
initial.lambda <- unemployment_coefs[3,2]
initial.s2 <- unemployment_coefs[4,2]

RoMLE.error(initial.beta, initial.s2, initial.lambda, W=TRQWM, y, x,
            phi.function=3, converge.v=0.0001, iter=100, print.values=TRUE)

#example 2
data(TRQWM)
data(IPS_data)
data(IPS_coefs)
y <- IPS_data[,3]
x <- IPS_data[,4:10]

#initial values was taken from MLE
```

```
initial.beta <- IPS_coefs[1:8,2]
initial.lambda <- IPS_coefs[9,2]
initial.s2 <- IPS_coefs[10,2]
RoMLE.error(initial.beta, initial.s2, initial.lambda, W=TRQWM, y, x,
            phi.function=3, converge.v=0.0001, iter=100, print.values=TRUE)
```

SpatialRoMLE   *Spatial Robust MLE Package*

Description

Robust Maximum Likelihood Estimation for Spatial Error Model.

Author(s)

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Yeliz Mert Kantar

References

Yildirim, V. and Kantar, Y.M. (2020). Robust estimation of spatial error model. in Journal of Statistical Computation and Simulation. https://doi.org/10.1080/00949655.2020.1740223

TRQWM   *Queen weight matrix of Turkey*

Description

This is queen continugity weight matrix of Turkey.

Usage

```
TRQWM
```

Format

A symmetric matrix with 81x81 values,

V provinces ID

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unemployment_coefs   *Initial coefficients of unemployment data*

Description

Initial coefficients of unemployment data were obtained by MLE.

Usage

```
unemployment_coefs
```

Format

A list with 4 values, which are:

(Intercept) intercept

Unemployment_Rate unemployment rate

lambda spatial autocorrelation parameter

s2 variance

---

unemployment_data   *Unemployment data of Turkey*

Description

This is unemployment data of Turkey for analysing spatial error model.

Usage

```
unemployment_data
```

Format

A list with 4 variables, which are:

ID provinces ID

province provinces names

unemployment unemployment rate

urbanization urbanization rate

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