Package 'sgstar'

May 9, 2026

Type Package

Title Seasonal Generalized Space Time Autoregressive (S-GSTAR) Model

Version 0.1.2

Description A set of function that implements for seasonal multivariate time series analysis based on Seasonal Generalized Space Time Autoregressive with Seemingly Unrelated Regression (S-GSTAR-SUR) Model by Setiawan(2016)<https://www.researchgate.net/publication/316517889_S-GSTAR-SUR_model_for_seasonal_spatio_temporal_data_forecasting>.

License GPL-3

Imports dplyr,ggplot2,stats,tidyr,utils

Encoding UTF-8

LazyData true

RoxygenNote 7.1.0

Suggests knitr,rmarkdown

Depends R (>= 3.5.0)

URL https://github.com/yogasatria30/sgstar

BugReports https://github.com/yogasatria30/sgstar/issues

NeedsCompilation no

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Repository CRAN

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Contents

`coords` *Coordinate of region in South Sumatera*

Description

A simple `tibble` dataset containing the coordinate region In South.

Usage

```
coords
```

Format

A `tibble` with 17 rows as Region/City and 2 column,which are:

"Longitude" longitude coordinate for each location

"Latitude" latitude coordinate for each location

Source

https://www.bps.go.id/

`plot_sgstar` *Timeseries Plot for Model*

Description

Plotting line chart dataset and fit.values of the Seasonal GSTAR model.

Usage

```
plot_sgstar(formula)
```

Arguments

`formula`	an object from the output from sgstar() function.

Value

returns output a list that shown line chart for each location.

Examples

```
library(sgstar)
data("coords")
data("simulatedata")

#create weight matrix using distance inverse matrix

z<-dist(coords,method = "euclidean")
z <- as.matrix(z)

matriksd <- 1/z
matriksd[is.infinite(matriksd)] <- 0

matriksd_w <- matriksd / rowSums(as.data.frame(matriksd))

fit <- sgstar(data = simulatedata, w = matriksd_w, p = 2,ps = 1, s =4)
plot1 <- plot_sgstar(fit)
```

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predict_sgstar *Predict for Seasonal GSTAR model.*

Description

Predicting value based on Sgstar object

Usage

```
predict_sgstar(formula, n_time)
```

Arguments

formula	an object from the output from sgstar() function.
n_time	number of steps ahead for which prediction is required.

Value

returns output a dataframe that shown predict value based on model, with rows as time and column that shown for each location.

References

Setiawan, Suhartono, and Prastuti M.(2016).S GSTAR-SUR for Seasonal Spatio Temporal Data Forecasting. Malaysian Journal Of Mathematical Sciences.10.<Corpus ID :189955959>.

Examples

```
library(sgstar)
data("coords")
data("simulatedata")

#create weight matrix using distance inverse matrix
z<-dist(coords,method = "euclidean")
z <- as.matrix(z)

matriksd <- 1/z
matriksd[is.infinite(matriksd)] <- 0

matriksd_w <- matriksd / rowSums(as.data.frame(matriksd))


fit <- sgstar(data = simulatedata, w = matriksd_w, p = 2,ps = 1, s =4)

#predicting for 12 time ahead
predict.fit <-predict_sgstar(fit,12)
```

`sgstar` *Fit Seasonal Generalized Space Time Autoregressive Model*

Description

sgstar function return the parameter estimation of Seaonal Generalized Space Time Autoregressive Model by using Generalized Least Square (GLS)

Usage

```
sgstar(data, w, p, ps, s)
```

Arguments

`data`	A dataframe that contain timeseries data with k column as space and n rows as time.
`w`	a spatial weight, matrix ncol(data) * ncol(data) with diagonal = 0.
`p`	an autoregressive order, value must be greater than 0.
`ps`	an autoregressive order for seasonal, value must be greater than 0.
`s`	an order of the seasonal period

Value

sgstar returns output with detail are shown in the following list :

`Coefficiens`	coefficiens parameter model for each location
`Fitted.Values`	a dataframe with fit value for each location based on model

`Residual` a dataframe that contain residual,that is response minus fitted values based on model

`Performance` a dataframe containing the following objects:

- MSE : Mean Squared Error (MSE) for all the data combined.
- RMSE : Root Mean Squared Error (RMSE) for all the data combined.
- AIC : a Version of Akaike's Information Criterion (AIC)
- Rsquared : R^2, the 'fraction of variance explained by the model'.

`p` an autoregressive order

`ps` an autoregressive order for seasonal

`s` an order of the seasonal period

`weight` a spatial weight

`data` a dataset that used in modeling

References

Setiawan, Suhartono, and Prastuti M.(2016).S GSTAR-SUR for Seasonal Spatio Temporal Data Forecasting. Malaysian Journal Of Mathematical Sciences.10.<Corpus ID :189955959>.

Examples

```
library(sgstar)
data("coords")
data("simulatedata")

#create weight matrix using distance inverse matrix

z<-dist(coords,method = "euclidean")
z <- as.matrix(z)

matriksd <- 1/z
matriksd[is.infinite(matriksd)] <- 0

matriksd_w <- matriksd / rowSums(as.data.frame(matriksd))

fit <- sgstar(data = simulatedata, w = matriksd_w, p = 2,ps = 1, s =4)
fit
```

`simulatedata` *Sample Data for simulate analysis data*

Description

A simple `tibble` that is generate from random normal distribution for simulate seasonal generalized space-time autoregressive model.

Usage

```
simulatedata
```

Format

A `tibble` with 100 observation time and 17 column as location,which are:

"PALEMBANG" a value dataset for PALEMBANG

"LUBUKLINGGAU" a value dataset for LUBUKLINGGAU

"OGAN KOMERING ULU SELATAN" a value dataset for OGAN KOMERING ULU SELATAN

"OGAN KOMERING ULU" a value dataset for OGAN KOMERING ULU

"OGAN KOMERING ILIR" a value dataset for OGAN KOMERING ILIR

"MUSI RAWAS" a value dataset for MUSI RAWAS

"OGAN ILIR" a value dataset for OGAN ILIR

"PAGAR ALAM" a value dataset for PAGAR ALAM

"BANYU ASIN" a value dataset for BANYU ASIN

"OGAN KOMERING ULU TIMUR" a value dataset for OGAN KOMERING ULU TIMUR

"EMPAT LAWANG" a value dataset for EMPAT LAWANG

"PRABUMULIH" a value dataset for EMPAT LAWANG

"LAHAT" a value dataset for LAHAT

"MUSI RAWAS UTARA" a value dataset for MUSI RAWAS UTARA

"PENUKAL ABAB LEMATANG ILIR" a value dataset for PENUKAL ABAB LEMATANG ILIR

"MUARA ENIM" a value dataset for MUARA ENIM

"MUSI BANYUASIN" a value dataset for MUSI BANYUASIN

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