

Package ‘stlARIMA’

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Type Package

Title STL Decomposition and ARIMA Hybrid Forecasting Model

Version 0.1.0

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Description Univariate time series forecasting with STL decomposition based auto regressive integrated moving average (ARIMA) hybrid model. For method details see Xiong T, Li C, Bao Y (2018). <[doi:10.1016/j.neucom.2017.11.053](https://doi.org/10.1016/j.neucom.2017.11.053)>.

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LazyData true

RoxygenNote 7.1.1

Imports forecast

Depends R (>= 2.10)

NeedsCompilation no

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Data_potato

Normalized Monthly Average Potato Price of India

Description

Normalized monthly average potato price of India from January 2014 to July 2020.

Usage

```
data("Data_potato")
```

Format

A time series data with 79 observations.

price a time series

Details

Dataset contains 79 observations of normalized monthly average potato price of India.

Source

Department of Consumer Affairs, Govt. of India

References

<https://consumeraffairs.nic.in/>

Examples

```
data(Data_potato)
```

STLARIMA

STL Based ARIMA Forecasting Model

Description

The STLARIMA function forecasts a time series using a hybrid model made of a decomposition technique called seasonal trend decomposition based on loess (STL) and a forecasting technique called ARIMA. The function further computes the values of different forecasting evaluation criteria.

Usage

```
STLARIMA(data, stepahead=10)
```

Arguments

<code>data</code>	Input univariate time series (ts) data.
<code>stepahead</code>	The forecast horizon.

Details

This function decomposes a nonlinear, nonstationary and seasonal time series into trend-cycle, seasonal and remainder component using STL (Cleveland et al., 1990). ARIMA model is used to forecast these components individually (Box et al., 2015, Jha and Sinha, 2013). Finally, the prediction results of all the three components are aggregated to formulate an ensemble output for the input time series.

Value

<code>data_test</code>	Testing set used to measure the out of sample performance.
<code>STLcomp_forecast</code>	Forecasted value of all individual components.
<code>stlARIMA_forecast</code>	Final forecasted value of the stlARIMA model. It is obtained by combining the forecasted value of all individual components.
<code>MAE_stlARIMA</code>	Mean Absolute Error (MAE) for stlARIMA model.
<code>MAPE_stlARIMA</code>	Mean Absolute Percentage Error (MAPE) for stlARIMA model.
<code>rmse_stlARIMA</code>	Root Mean Square Error (RMSE) for stlARIMA model.

References

- Cleveland, R.B., Cleveland, W.S., McRae, J.E., Terpenning, I. (1990). STL: A seasonal-trend decomposition procedure based on loess, *Journal of Official Statistics*, 6, 3–73.
- Box, G.E.P, Reinsel, G.C., Jenkins, G.M., Ljung, G.M. (2015). *Time Series Analysis: Forecasting and Control*. Wiley, Germany.
- Jha, G.K., Sinha, K. (2013). Agricultural price forecasting using neural network model: An innovative information delivery system. *Agricultural Economics Research Review*, 26, 229–239.

Examples

```
data("Data_potato")
STLARIMA(Data_potato)
```

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