Package 'GreyModel'

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Type Package

Title Fitting and Forecasting of Grey Model

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Maintainer Mrinmoy Ray <mrinmoy4848@gmail.com>

Description Testing, Implementation and Forecasting of Grey Model (GM(1, 1)). For method details see Hsu, L. and Wang, C. (2007). <doi:10.1016/j.techfore.2006.02.005>.

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Author Mrinmoy Ray [aut, cre],
Rajeev Ranjan kumar [aut, ctb],
K.N. Singh [ctb],
Ramasubramanian V. [ctb],
Kanchan Sinha [ctb]

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R topics documented:

fcast_grey *Grey Model Forecast*

Description

The fcast_grey function computes the h step ahead forecast values.

Usage

```
fcast_grey(data, h=3)
```

Arguments

data	Input univariate time series (ts) data.
h	The forecast horizon.

Details

This function returns the fitted Grey model's h step ahead forecasted values.

Value

Forecasted_value
: h step ahead forecasted values of the fitted Grey Model.

References

Hsu, L. and Wang, C. (2007). Forecasting the output of integrated circuit industry using a grey model improved by the Bayesian analysis. Technological Forecasting and Social Change, 74, 843–853.

Ou, S. (2012). Forecasting agricultural output with an improved grey forecasting model based on the genetic algorithm. Computer and Electronics in Agriculture, 85, 33–39.

Wang, C. and Hsu, L. (2008). Using genetic algorithms grey theory to forecast high technology industrial output. Applied Mathematics and Computation, 195, 256–263.

See Also

GM, GM_test

Examples

```
xt <- c(640,724,813,1145,1509,2122,1883,2413,2834,4235,7144,5269)
fcast_grey(data=xt)
```

GM *Grey Model Fitting*

Description

The GM function fit GM (1, 1) model for time series data.

Usage

```
GM(data)
```

Arguments

data	Input univariate time series (ts) data.

Details

In situations where there are limited observations available for modelling, grey modelling may be employed (Hsu and Wang, 2007). Using the OLS approach, this function calculates the parameters (a and b) of the GM (1, 1) model. Additionally, this function returns the model's fitted values and different evaluation criteria.

Value

a	Grey model parameter
b	Grey model parameter
MAE_Grey	Mean Absolute Error (MAE) of fitted Grey model
MAPE_Grey	Mean Absolute Percentage Error (MAPE) of fitted Grey model
MSE_Grey	Mean Square Error (MSE) of fitted Grey model
RMSE_Grey	Root Mean Square Error (RMSE) of fitted Grey model
fitted	Fitted values of Grey model

References

Hsu, L. and Wang, C. (2007). Forecasting the output of integrated circuit industry using a grey model improved by the Bayesian analysis. Technological Forecasting and Social Change, 74, 843–853.

Mao, M. and Chirwa, E. C. (2006). Application of grey model GM(1, 1) to vehicle fatality risk estimation. Technological Forecasting and Social Change, 73, 588–605.

See Also

GM_test, fcast_grey

Examples

```
xt <- c(640,724,813,1145,1509,2122,1883,2413,2834,4235,7144,5269)
GM(xt)
```

GM_test *Grey Model Test for Data Suitability*

Description

The GM_test function test the suitability of data for Grey modelling.

Usage

```
GM_test(data)
```

Arguments

data	Input univariate time series (ts) data.

Details

On the considered time series data, this function computes the ratio sequence. The data is suitable for grey modelling if the sequence value falls between 0.1345 and 7.389 (Hsu and Wang, 2007).

Value

Test_Result	If the data is suitable for grey modelling, "data is suitable for Grey modelling" will be printed; otherwise, "data is not suitable for Grey modelling" will be printed.

References

Hsu, L. and Wang, C. (2007). Forecasting the output of integrated circuit industry using a grey model improved by the Bayesian analysis. Technological Forecasting and Social Change, 74, 843–853.

See Also

GM, fcast_grey

Examples

```
xt <- c(640,724,813,1145,1509,2122,1883,2413,2834,4235,7144,5269)
GM_test(data=xt)
```

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