Package 'DWaveNARDL'

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Type Package

Title Dual Wavelet Based NARDL Model

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Description Dual Wavelet based Nonlinear Autoregressive Distributed Lag model has been developed for noisy time series analysis. This package is designed to capture both short-run and long-run relationships in time series data, while incorporating wavelet transformations. The methodology combines the NARDL model with wavelet decomposition to better capture the nonlinear dynamics of the series and exogenous variables. The package is useful for analyzing economic and financial time series data that exhibit both long-term trends and short-term fluctuations. This package has been developed using algorithm of Jammazi et al. <doi:10.1016/j.intfin.2014.11.011>.

License GPL-3

Encoding UTF-8

Imports nardl, wavelets, stats, roxygen2

RoxygenNote 7.2.1

NeedsCompilation no

Repository CRAN

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Contents

DWNARDL   *Wavelet-based NARDL Model*

Description

This function implements the Wavelet-based Nonlinear Autoregressive Distributed Lag (WNARDL) model using wavelet transform.

Usage

```
DWNARDL(ts, Filter = "haar", Wvlevels = NULL, Exo, MaxLag = 3, Trend = TRUE)
```

Arguments

ts	A time series object (numeric vector) for the dependent variable.
Filter	Wavelet filter to use (default is "haar").
Wvlevels	Number of wavelet decomposition levels. Default is calculated based on the length of 'ts'.
Exo	A time series object (numeric vector) for the exogenous variable.
MaxLag	Maximum number of lags to consider. Default is 3.
Trend	Boolean to include trend in the model. Default is TRUE.

Value

A list containing:

Coefficients	Model coefficients (short and long run).
AsymTest	Wald test statistics and p-values.
IC	Information criteria (AIC, BIC, Log-likelihood).

References

Jammazi, R., Lahiani, A., & Nguyen, D. K. (2015). A wavelet-based nonlinear ARDL model for assessing the exchange rate pass-through to crude oil prices. *Journal of International Financial Markets, Institutions and Money, 34*, 173-187. https://doi.org/10.1016/j.intfin.2014.11.011

Examples

```
ts <- rnorm(100)
Exo <- rnorm(100)
Results <- DWNARDL(ts, Filter = "haar", Exo = Exo, MaxLag = 3)
```

NARDL   *Dual Wavelet-based NARDL Model*

Description

This function implements the Dual Wavelet-based Nonlinear Autoregressive Distributed Lag (NARDL) model.

Usage

```
NARDL(Data, Exo, MaxLag, Trend = TRUE)
```

Arguments

Data   A time series object (numeric vector) representing the dependent variable.

Exo   A time series object (numeric vector) representing the exogenous variable.

MaxLag   Maximum number of lags to consider.

Trend   Boolean to include trend in the model. Default is TRUE.

Value

A list containing:

Coefficients   Model coefficients (short and long run).

AsymTest   Wald test statistics and p-values.

IC   Information criteria (AIC, BIC, Log-likelihood).

References

Jammazi, R., Lahiani, A., & Nguyen, D. K. (2015). A wavelet-based nonlinear ARDL model for assessing the exchange rate pass-through to crude oil prices. *Journal of International Financial Markets, Institutions and Money, 34*, 173-187. https://doi.org/10.1016/j.intfin.2014.11.011

Examples

```
Data <- rnorm(100)
Exo <- rnorm(100)
Results <- NARDL(Data, Exo, MaxLag = 3)
```

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