Package: forecastADAPT (via r-universe)

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Title Computation of Adaptive Forecast

Version 0.1.0

Description The function forAD() implements the adaptive forecasting procedure of Giraitis, Kapetanios and Price (2013) <doi:10.1016/j.jeconom.2013.04.003>. The method can be iterated (e.g., adapt²) and combined with autoregressive (AR) forecasting. These approaches are computationally simple and adapt automatically to structural changes without requiring prior specification of the underlying data-generating process. They are applicable to both stationary and non-stationary time series. The numerical and graphical outputs assist in selecting an appropriate forecasting method, particularly one that minimises mean squared forecast error (MSFE) and yields uncorrelated forecast errors.

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Encoding UTF-8

Imports stats, graphics, lubridate, grDevices, knitr, testcorr, xts, zoo

RoxygenNote 7.3.3

Suggests testthat

NeedsCompilation no

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Contents

`forAD` *Computing adaptive forecast*

Description

The functions forAD computes the adaptive one-step ahead forecast of Giraitis, Kapetanios and Price (2013).

Usage

```
forAD(x, p_max = 3, T0 = 50, n_v = 100, n_AR = 400,
      plots = TRUE, P = 50, PL = 500, p = 1, date_1 = NULL)
```

Arguments

`x`	A univariate numeric time series (`ts`, `xts`, `zoo`) object or a numeric vector or a numeric data frame column.
`p_max`	Maximum order of the AR model. Default is `3`. If set to `0`, no AR is estimated.
`T0`	Length of the training period used to select tuning parameter ρ. Default is `50`.
`n_v`	Length of the period of forecast errors used in calculation of MSFE. Default is `100`.
`n_AR`	Length of the period of forecast errors used for estimation of AR and for computing correlograms. Default is `400`.
`plots`	Logical. If `TRUE` (default), the following plots are produced: 1) Rolling MSFEs (adapt, adapt+AR(p), adapt^2, adapt^2+AR(p), $p = 1, ..., p_{max}$), 2) Rolling tuning parameters ρ (adapt, adapt^2), 3) Rolling one-step ahead forecasts (adapt, adapt+AR(p), adapt^2, adapt^2+AR(p) for selected p) and the data, 4) Rolling forecast errors (adapt, adapt+AR(p), adapt^2, adapt^2+AR(p) for selected p), 5) Correlograms of the forecast errors. Alternatively, `plots` can be a logical vector specifying which plots, 1)–5), to display.
`P`	Length of the period used in plots. Default is `50`.
`PL`	Length of the longer period used in plots. Default is `500`.
`p`	Selected AR order used in plots. Default is `1`.
`date_1`	The date for the one-step ahead forecast when `x` has dates. Default is `NULL`.

Details

The method implements the adaptive (one-stage adapt or two-stage adapt^2) one-step ahead forecasting with weights $w_{j,\rho} \propto \rho^j$ for $0 < \rho \leq 1$ (normalized to sum up to 1) in the 1st step, combined with AR forecasting in 2nd step.

Value

An object of class '`forAD`', which is a list with the following components:

`for_1`	The one-step ahead forecast for all methods (adapt, adapt+AR(p), adapt^2, adapt^2+AR(p), $p = 1, ..., p_{max}$).
`rho`	The tuning parameter for adaptive methods (adapt, adapt^2).
`ar_coef_se`	The estimated coefficients and their standard errors for the adapt+AR(p), $p = 1, ..., p_{max}$.
`ar_coef_se_sq`	The estimated coefficients and their standard errors for the adapt^2+AR(p), $p = 1, ..., p_{max}$.
`MSFE`	The MSFE for all methods.
`for_in`	The rolling one-step ahead forecasts for all methods.
`rho_in`	The rolling tuning parameters for adaptive methods.
`MSFE_in`	The rolling MSFE for all methods.
`err_in`	The rolling one-step ahead forecast errors for all methods.
`data`	The original data.

Note

Missing values are not allowed.
Permitted sample size: $N \geq 25 + 2p_{max}$ when `p_max > 0` and $N \geq 21$ when `p_max = 0`.

Author(s)

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References

Giraitis L, Kapetanios G, Price S (2013). "Adaptive Forecasting in the Presence of Recent and Ongoing Structural Change." Journal of Econometrics, 177(2), 153-170. doi:10.1016/j.jeconom.2013.04.003.
Giraitis L, Kapetanios G, Mansur M, Price S (2015). "Forecasting Under Structural Change." In J Beran, Y Feng, H Hebbel (eds.), Empirical Economic and Financial Research: Theory, Methods and Practice, pp. 401–419. Springer International Publishing, Cham. doi:10.1007/9783319031224_25.

Examples

```
# Sample x contains 200 independent standard normal data.
x <- rnorm(200)
print(forAD(x, plots = FALSE))
# Set plots to TRUE to see the plots.
print(forAD(x))
```

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