Package ‘BootPR’

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Description

The package provides alternative bias-correction methods for univariate autoregressive model parameters; and generate point forecasts and prediction intervals for economic time series. A future version will include the case of vector AR models.

Details

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Author(s)

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Description

This function returns the Andrews-Chen estimates for AR coefficients, residuals, and AR forecasts generated using the Andrews-Chen estimates

Usage

Andrews.Chen(x, p, h, type)

Arguments

x a time series data set
p AR order
h the number of forecast periods
type "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend
**Value**

- coef: Andrews-Chen median-unbiased estimates
- ecm.coef: the coefficients in the ADF form
- resid: residuals
- forecast: point forecasts from Andrews-Chen estimates

**Note**

The Andrews-Chen estimator may break down when the AR order is very high. I recommend that AR order be kept low.

**Author(s)**

Jae H. Kim

**References**


**Examples**

```r
data(IPdata)
BootBC(IPdata, p=1, h=10, nboot=200, type="const+trend")
```

**Description**

AR model selection using AIC, BIC, HQ

**Usage**

```r
ARorder(x, pmax, type)
```

**Arguments**

- `x`: a time series data set
- `pmax`: the maximum AR order
- `type`: "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend
Value

ARorder AR orders selected by AIC, BIC and HQ
Criteria the values of AIC, BIC and HQ

Author(s)

Jae H. Kim

Examples

data(IPdata)
AROrder(IPdata,pmax=12,type="const+trend")

Description

This function calculates bootstrap-after-bootstrap prediction intervals and bootstrap bias-corrected point forecasts

Usage

BootAfterBootPI(x, p, h, nboot, prob, type)

Arguments

x a time series data set
p AR order
h the number of forecast periods
nboot number of bootstrap iterations
prob a vector of probabilities
type "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend

Value

PI prediction intervals
forecast bias-corrected point forecasts

Author(s)

Jae H. Kim
References


Examples

data(IPdata)
BootAfterBootPI(IPdata,p=1,h=10,nboot=100,prob=c(0.05,0.95),type="const+trend")

Description

This function returns bias-corrected parameter estimates and forecasts for univariate AR models.

Usage

BootBC(x, p, h, nboot, type)

Arguments

x a time series data set
p AR order
h the number of forecast period
nboot number of bootstrap iterations
type "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend

Value

coef Bootstrap bias-corrected parameter estimates
resid residuals
forecast point forecasts from bootstrap bias-corrected parameter estimates

Author(s)

Jae H. Kim

References

BootPI

Bootstrap prediction intervals and point forecasts with no bias-correction

Description
This function returns bootstrap forecasts and prediction intervals with no bias-correction

Usage
BootPI(x, p, h, nboot, prob, type)

Arguments
x a time series data set
p AR order
h the number of forecast periods
nboot number of bootstrap iterations
prob a vector of probabilities
type "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend

Value
PI prediction intervals
forecast bias-corrected point forecasts

Author(s)
Jae H. Kim

References

Examples
data(IPdata)
BootBC(IPdata, p=1, h=10, nboot=100, type="const+trend")
IPdata

**US industrial production data**

**Description**

From Extended Nelson-Plosser data set, annual, 1860-1988

**Usage**

```r
data(IPdata)
```

**References**


**Examples**

```r
data(IPdata)
```

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**LS.AR**

**OLS parameter estimates and forecasts, no bias-correction**

**Description**

The function returns parameter estimates and forecasts from OLS estimation for AR models

**Usage**

```r
LS.AR(x, p, h, type, prob)
```

**Arguments**

- `x` a time series data set
- `p` AR order
- `h` the number of forecast period
- `prob` a vector of probabilities
- `type` "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend
Value
- coef: OLS parameter estimates
- resid: OLS residuals
- forecast: point forecasts from OLS parameter estimates
- PI: Prediction Intervals based on OLS parameter estimates based on normal approximation

Author(s)
Jae H. Kim

Examples
```r
data(IPdata)
LS.AR(IPdata, p=6, h=10, type="const+trend", prob=c(0.05, 0.95))
```

Plot.Fore

Plotting point forecasts

Description
The function returns plots the point forecasts

Usage
```r
Plot.Fore(x, fore, start, end, frequency)
```

Arguments
- x: a time series data set
- fore: point forecasts
- start: starting date
- end: ending date
- frequency: data frequency

Details
- frequency=1 for annual data, 4 for quarterly data, 12 for monthly data
- start=c(1980,4) indicates April 1980 if frequency=12
- end = c(2000,1) indicates 1st quarter of 2000 if frequency = 4

Value
- plot
**Plot.PI**

*Plotting prediction intervals and point forecasts*

**Author(s)**

Jae H. Kim

**Examples**

```r
data(IPdata)
BootF <- bootBC(IPdata,p=1,h=10,nboot=100,type="const+trend")
Plot.Fore(IPdata,BootF$forecast,start=1860,end=1988,frequency=1)
```

---

**Description**

The function returns plots the point forecasts and prediction intervals.

**Usage**

```r
Plot.PI(x, fore, Interval, start, end, frequency)
```

**Arguments**

- `x`: a time series data set
- `fore`: point forecasts
- `Interval`: Prediction Intervals
- `start`: starting date
- `end`: ending date
- `frequency`: data frequency

**Details**

- `frequency=1` for annual data, `4` for quarterly data, `12` for monthly data
- `start=c(1980,4)` indicates April 1980 if `frequency=12`
- `end = c(2000,1)` indicates 1st quarter of 2000 if `frequency = 4`

**Value**

- `plot`

**Author(s)**

Jae H. Kim

**Examples**

```r
data(IPdata)
PI <- ShamanStine.PI(IPdata,p=1,h=10,nboot=100,prob=c(0.025,0.05,0.95,0.975),type="const+trend",0)
Plot.PI(IPdata,PI$forecast,PI$PI,start=1860,end=1988,frequency=1)
```
Roy.Fuller  

Roy-Fuller median-unbiased estimation

Description
This function returns parameter estimates and forecasts based on Roy-Fuller median-unbiased estimator for AR models.

Usage
Roy.Fuller(x, p, h, type)

Arguments
x a time series data set
p AR order
h the number of forecast period
type "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend

Value
coef Roy-Fuller parameter estimates
resid residuals
forecast point forecasts from Roy-Fuller parameter estimates

Author(s)
Jae H. Kim

References

Examples
data(IPdata)
Roy.Fuller(IPdata,p=6,h=10,type="const+trend")
Bootstrap prediction interval using Shaman and Stine bias formula

Description
The function returns bias-corrected forecasts and bootstrap prediction intervals using Shaman and Stine bias formula for univariate AR models.

Usage
ShamanStine.PI(x, p, h, nboot, prob, type, pmax)

Arguments
- x: a time series data set
- p: AR order
- h: the number of forecast periods
- nboot: number of bootstrap iterations
- prob: a vector of probability values
- type: "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend
- pmax: for exogenous lag order algorithm, pmax = 0, for endogenous lag order algorithm, pmax is an integer greater than 0

Value
- PI: prediction intervals
- forecast: bias-corrected point forecasts

Author(s)
Jae H. Kim

References
Examples

data(Ipdata)
ShamanStine.PI(Ipdata,p=1,h=10,nboot=100,prob=c(0.05,0.95),type="const+trend",pmax=0)


data(Ipdata)
ShamanStine.PI(Ipdata,p=1,h=10,nboot=100,prob=c(0.05,0.95),type="const+trend",pmax=0)

Stine.Shaman

bias-corrected estimation based on Shaman-Stine formula

Description

The function returns parameter estimates and bias-corrected forecasts using Shaman and Stine bias formula for univariate AR models

Usage

Stine.Shaman(x, p, h, type)

Arguments

- x: a time series data set
- p: AR order
- h: the number of forecast period
- type: "const" for the AR model with intercept only, "const+trend" for the AR model with intercept and trend

Value

- coef: Bias-corrected parameter estimates using Shama-Stine formula
- resid: residuals
- forecast: point forecasts from bias-corrected parameter estimates

Author(s)

Jae H. Kim

References

Examples

data(IPdata)
Stine.Shaman(IPdata,p=6,h=10,type="const+trend")
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