Package ‘caschrono’

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Title S<e9>ries Temporelles Avec R

Description Functions, data sets and exercises solutions for the book ‘Séries Temporelles Avec R’ (Yves Aragon, edp sciences, 2016). For all chapters, a vignette is available with some additional material and exercises solutions.

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Description

Functions, data sets and exercises solutions for the book ‘Series temporelles avec R’ (Yves Aragon, edp sciences, 2016). For all chapters, a vignette is available with some additional material and exercises solutions.

Details

Package: caschrono
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References

Y. Aragon (2016), Series temporelles avec R, edp sciences

Plots of the ACF and PACF of a time series
Description

Plots of the ACF and PACF at the same lags

Usage

```r
acf2y(y, lag.max=40, numer=TRUE)
```

Arguments

- `y` A time series object
- `lag.max` An integer, the maximum lag
- `numer` A boolean; if TRUE the ACF and PACF are printed

Details

The ACF and PACF are plotted with the same scale.

Value

if numer=TRUE, it returns the values of ACF and PACF for each lag

Author(s)

Yves Aragon, Thibault Laurent

References


See Also

`xy.acfb`

Examples

```r
data("nottem")
acf2y(nottem)
```
Description

armaselect implements the MINIC (Minimum Information Criterion) identification method and returns the nbmod best ARMA models, with respect to the Schwarz's Bayesian Criterion (sbc).

Usage

armaselect(y, max.p = 15, max.q = 15, nbmod = 10)

Arguments

y
a time series

max.p
an integer, the maximum value for the autoregressive component, p

max.q
an integer, the maximum value for the moving average component, q

nbmod
an integer, the number of models that will be returned (nbmod may be lower than max.p x max.q).

Value

A matrix with nbmod rows and 3 columns (values of p, q and sbc)

Author(s)

Yves Aragon

Examples

set.seed(4123)
n2 <- 210
yc <- arima.sim(n = 200, list(ar = -0.8, ma = c(-0.3, 0.6)), sd = sqrt(1.5))
yc <- yc - 10
armaselect(yc, nbmod = 5)
Description

Box.test.2 computes at different lags, a 'Portemanteau' statistic for testing that a time series is a white noise.

Usage

Box.test.2(x, nlag, type = c("Box-Pierce", "Ljung-Box"), fitdf = 0, decim = 8)

Arguments

x           a time series object
nlag        a vector of integers: the lags where the statistic are computed
type        test to be performed
fitdf       number of degrees of freedom to be subtracted if x is a series of residuals
decim       an integer, the precision of the results

Details

This function uses the Box.test.

Value

It returns a matrix of size $n_{lag} \times 2$ with the statistics and the p-value

Author(s)

Yves Aragon

Examples

set.seed(123)
y1 = arima.sim(n = 100, list(ar = -.7), sd = sqrt(4))
al = Box.test.2(y1, nlag = c(3, 6, 9, 12), type = "Ljung-Box", decim = 4)
champa.ts

*Monthly shipments of bottles of champagne for the period 2001-2010*

**Description**


**Format**

The series first is imported as a vector of numeric type with function `scan` and then transformed into a `ts` object. Is is then converted in 1,000 of bottles.

**Source**

SRISE-DRAAF Champagne-Ardenne

**Examples**

```r
data("champa.ts")
# The executed code is :
## Not run:
aa <- scan(system.file("/import/champagne_2001.txt", package = "caschrono"))
champa.ts <- ts(aa/1000, start = c(2001,1), frequency = 12)
## End(Not run)
```

cor.arma

*Correlation matrix of the parameters for an Arima model*

**Description**

Computes the correlation matrix for the estimated parameters of an Arima model.

**Usage**

```r
cor.arma(mod)
```

**Arguments**

- `mod` - an Arima object

**Value**

A p x p matrix (p, the number of parameters of the ARIMA model)
**Examples**

```r
set.seed(4123)
n2 <- 210
yc <- arima.sim(n = 200, list(ar = -0.8, ma = c(-0.3, 0.6)),
                sd = sqrt(1.5))
yc <- yc - 10
if(require("forecast")){
  fit <- Arima(ye, order = c(1, 0, 2))
  cor.arma(fit)
}
```

---

**csdl**

*French stock and returns*

**Description**


**Usage**

data(csdl)

**Format**

This its object contains the following firms close prices:

- Cac40, ^FCHI (name of the quote symbol), common used French stock market index
- Socgen, GLE.PA (name of the quote symbol), Société générale
- Danone, BN.PA (name of the quote symbol), Danone
- L_Oreal, OR.PA (name of the quote symbol), L’Oréal

from 2006-01-02 to 2009-06-30.

**Source**

http://fr.finance.yahoo.com/
Examples

```r
if(require("timeSeries")){
  data(csd1)
  # we create then the returns
  aa = returns(csd1, percentage = TRUE)
  aab <- aa[complete.cases(aa) == TRUE,]
  # in previous version we use package its which will not be maintained anymore
  # r.csd1 = its(aab, as.POSIXct(row.names(aab)))
  r.csd1 = zoo(aab, as.POSIXct(row.names(aab)))
}
```

---

**essil**

*Essilor stock for the period 2006-2009*

---

**Description**

Essilor close price

**Usage**

data(essil)

**Format**

essil is an its object.

**Source**

http://fr.finance.yahoo.com/

**Examples**

data("essil")
# In 2011, code obtained like that
# require("its")
# deb = "2006-01-01"; fin = "2009-12-31"
# essil= priceIts(instrument="EI.PA",start=deb ,end=fin, quote="Close")
# colnames(essil) = "essilor"
# In 2016
# require("tseries")
# essil <- get.hist.quote(instrument = "EI.PA", start=deb ,end=fin, quote="Close")
**indbourse**  
*Stock price indices for the period 2006-2010*

**Description**

indbourse contains stock price indices for the period 2006-2010: Nikkei (name of the quote symbol: N225), ESTX50 EURP (STOXX50E), Dow Jones (DJI), Nasdaq (IXIC), CAC40 (^FCHI) and PARIS IND SBF120 (SBF120).

**Format**

indbourse is an its object.

**Source**

Yahoo finance

**Examples**

data(indbourse)

---

**khct**  
*Monthly electricity consumption for the period 1970-1984*

**Description**

Monthly electricity consumption, heating degree days and cooling degree days in some region for the period 1970-1984.

**Usage**

data(csd1)

**Details**

htdd (heating degree days) is minus the sum over the month of the daily difference between the average daily temperature, if it is lower than 65 F. degrees, and 65 F. degrees, the equilibrium temperature above which a house does not need to be heated.
cldd (cooling degree days) is the sum over the month of the daily difference between the average daily temperature, if it is greater than 65 F. degrees, and 65, the equilibrium temperature above which air conditioning is switched on.
The dataset is from the book by Pankratz (1981).
**Value**

csdl is a multivariate ts object which contains:

- **kwh**: electricity consumption in kilo-watt-hours
- **htdd**: heating degree days, in Fahrenheit degrees
- **cldd**: cooling degree days, in Fahrenheit degrees

**Source**


**Examples**

```r
data(khct)
# The executed code is :
## Not run:
khct = read.csv2(file= system.file("/import/conselec.csv",package="caschrono"))
attach(khct)
khc = ts(cbind(kwh, htdd,cldd), frequency = 12, start=c(1970,1))
kwh = khc[,1]
htdd = khc[,2]
cldd = khc[,3]
temps = time(kwh)
## End(Not run)
```

---

**lait**

*Milk collection in France*

**Description**

lait is the monthly milk collection in France, January 1980 - January 2010

**Format**

lait is a ts object

**Details**

Data are expressed in thousands of tons

**Source**

Enquête laitière mensuelle - Service de la Statistique et de la Prospective (SSP) - Ministère de l’Alimentation, de l’Agriculture et de la Pêche.

**Examples**

```r
data(lait)
```
**m30**

*Fatalities in car accidents in France for the period 1973-2006*

**Description**

m30 is the series of monthly fatalities in car accidents in France for the period 1973-2006.

**Usage**

```r
data(m30)
```

**Format**

Time series data

**Details**

The data from July 1973 to December 2004 have been multiplied by 1.069 to take into account the change of the definition of a fatal accident. Until 2004, an accident is fatal if death occurs within 6 days whereas from 2006 the deadline moves to 30 days.

**Source**

http://www.securite-routiere.org/Fiches/statistiques/statmensuelles.htm

**Examples**

```r
data(m30)
```

---

**plot2acf**

*ACF plots of two series*

**Description**

Plots the ACF of two series at the same lags

**Usage**

```r
plot2acf(y1, y2, lag.max=40, main=c("",""))
```

**Arguments**

- `y1`: A time series object
- `y2`: A time series object
- `lag.max`: An integer, the value of the maximum lag
- `main`: A vector of character, the title of the plot
We keep the same scale for the two graphs

no value

Yves Aragon and Thibault Laurent

data(nottem)
set.seed(2561)
innov1 = rnorm(290, sd=4.18)
y = arima.sim(list(order = c(12,0,1), ma=-.7, ar=c(rep(0,11),.9)),
innov =innov1, n.start =50, n = 240) + 50
plot2acf(nottem, y, main=c("ACF nottem","ACF SAR"))

plotacfthemp

Plots the ACF and PACF of a theoretical ARMA model and the empirical ACF and PACF of an observed series

plotacfthemp plots the ACF and PACF of a theoretical ARMA model and the empirical ACF and PACF of an observed series.

plotacfthemp(y, ar = numeric(0), ma = numeric(0), lag.max = 20, titre=""

Arguments

y time series, a ts object
ar numeric vector of AR coefficients
ma numeric vector of MA coefficients
lag.max integer, Maximum lag required.
titre a string of characters for the title

This function uses the ARMAacf and acf functions to compute theoretical and empirical ACF and PACF
Value

No values

Author(s)

Yves Aragon and Thibault Laurent

Examples

```r
set.seed(951)
ya <- arima.sim(n=200, list(ma = c(-0.3, 0.6)),
sd = sqrt(1.5))
plotacfthemp(ya, ma=c(-0.3,0.6), titre="MA(2)"
```

---

**popfr**

*French population for the period 1846-1951*

Description

`popfr` is the French population average for the period 1846-1951.

Usage

data(popfr)

Format

Time series data

Details

One unit: 1,000 inhabitants. Two missing values in 1916 and 1941

Source

http://www.insee.fr/fr/themes/tableau.asp?ref_id=NATnon02145

Examples

```r
data(popfr)
```
Description

The file "Tel_extrait.csv" has been created by an automatic telephone exchange system in a firm; the date includes the day, the month and the year ordered like this: D, M, Y.

Format

The series is first imported as a data.frame object and then transformed into a ts object.

Examples

don.mois1=read.csv2(file= system.file("/import/Tel_extrait.csv",package="caschrono"),
col.names=c("Date.app", "Heur.deb.app", "Code Dest", "Dest Det", "Dur app sec.", "Mont app EU"), skip=0, stringsAsFactors=FALSE)

trafmensu Monthly Air traffic at Toulouse Blagnac Airport for the period 1993-2007

Description

The file "/import/trafquoti.txt" contains daily Air traffic at Toulouse Blagnac Airport for the period 1993-2007.

Format

The series is imported first as a data.frame with function read.table, aggregated by month and then transformed into a ts object. It is then converted in 1.000 of people.

Source

Chambre de Commerce et d’Industrie de Toulouse (CCIT)

Examples

data(trafmensu)
# The executed code is:
## Not run:
bb=read.table(file= system.file("/import/trafquoti.txt",package="caschrono"),
header=FALSE,quote="", sep="", colClasses=c('numeric','character'),
col.names =c('trafic','date'))
mois.an= as.numeric(paste(substr(bb$date,1,4), substr(bb$date,6,7), sep=""))
trafmens=aggregate(bb$traf, list(Mois.An = mois.an), sum)
trafmensu=ts(trafmens$x/1000,start= c(1993,1),frequency= 12)
## End(Not run)
Description

It computes the t-statistics tests for the coefficients of an Arima model.

Usage

t_stat(modarima, decim=6)

Arguments

modarima an Arima object
decim an integer, the precision of the results

Details

modarima may be created with the function Arima (package forecast) or arimax (package TSA).

Value

It returns a matrix 2 x (number of free coefficients) of the t-statistics and the p-values.

Author(s)

Yves Aragon

Examples

if(require("forecast"))
{set.seed(123)
y1 = arima.sim(n=100, list(ar=-.7), sd=sqrt(4))
my1 = Arima(y1, order=c(1,0,0), include.mean = FALSE)
t_stat(my1)
}
Description

xy.acfb plots a time series and its ACF and PACF at the same lags.

Usage

xy.acfb(y, lag.max=40, numer=TRUE)

Arguments

y
A time series object

lag.max
An integer, the value of the maximum lag

numer
A boolean, =TRUE for printing the value of ACF and PACF by lag

Details

We keep the same scale for the ACF and the PACF

Value

if numer=TRUE, it prints the values of ACF and PACF for each lag

Author(s)

Yves Aragon and Thibault Laurent

References


See Also

acf2y

Examples

data(nottem)
xy.acfb(nottem)
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