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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`caschrono-package` *Series 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.

Details

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Author(s)

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References

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

`acf2y` *Plots of the ACF and PACF of a time series*

Description

Plots of the ACF and PACF at the same lags

Usage

```
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

Shumway R. and Stoffer D., Time Series Analysis and Its Applications - With R Examples, 2nd ed., 2006, Springer.

See Also

xy.acfb

Examples

```
data("nottem")
acf2y(nottem)
```

armaselect *Minic method*

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)
```

Box.test.2 *'Portemanteau' tests*

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 nlag x 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))
a1 = 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

The file "/import/champagne_2001.txt" contains monthly total shipping of 75 cl bottles of Champagne wine, in the world. 2001-2010.

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

```
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

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

Arguments

`mod`	an Arima object

Value

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

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
if(require("forecast")){
fit <- Arima(yc, order = c(1, 0, 2))
cor.arma(fit)
}
```

---

csdl *French stock and returns*

Description

French stocks (Cac40, Société générale, Danone, L'Oréal) for the period 2006 - 2009, on Euronext Paris.

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

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

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

Pankratz A., Forecasting with dynamic regression models, 1991, Wiley.

Examples

```
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

```
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

```
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

```
data(m30)
```

plot2acf *ACF plots of two series*

Description

Plots the ACF of two series at the same lags

Usage

```
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

Details

We keep the same scale for the two graphs

Value

no value

Author(s)

Yves Aragon and Thibault Laurent

Examples

```
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*

Description

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

Usage

```
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

Details

This function uses the `ARMAacf` and `acf` functions to compute theoritical and empirical ACF and PACF

Value

No values

Author(s)

Yves Aragon and Thibault Laurent

Examples

```
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
http://dev-www.ined.fr/fr/pop_chiffres/france/structure_population/recensement_1846/

Examples

```
data(popfr)
```

Tel_extrait *Telephone consumption in a firm*

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. Is 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)
```

t_stat *Arima coefficients tests*

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)
}
```

`xy.acfb` *Representation of a time series and its ACF and PACF*

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

Shumway R. and Stoffer D., Time Series Analysis and Its Applications - With R Examples, 2nd ed., 2006, Springer.

See Also

`acf2y`

Examples

```
data(nottem)
xy.acfb(nottem)
```

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