

Package ‘fma’

January 14, 2020

Title Data Sets from “Forecasting: Methods and Applications” by Makridakis, Wheelwright & Hyndman (1998)

Description All data sets from “Forecasting: methods and applications” by Makridakis, Wheelwright & Hyndman (Wiley, 3rd ed., 1998) <<https://robjhyndman.com/forecasting/>>.

Version 2.4

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LazyData yes

LazyLoad yes

License GPL-3

URL <https://pkg.robjhyndman.com/fma/>,
<https://github.com/robjhyndman/fma>

BugReports <https://github.com/robjhyndman/fma/issues>

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Suggests knitr, rmarkdown, tidyverse

VignetteBuilder knitr

NeedsCompilation no

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R topics documented:

fma-package	3
advert	4
advsales	4
airpass	5
auto	6

bank	7
beer	7
bicoal	8
books	8
boston	9
bricksq	10
canadian	10
capital	11
cement	11
chicken	12
condmilk	13
copper	13
copper1	14
copper2	14
copper3	15
cowtemp	15
cpimel	16
dexter	16
dj	17
dole	18
dowjones	18
econsumption	19
eggs	19
eknives	20
elco	20
elec	21
expenditure	21
fancy	22
french	22
housing	23
hsales	24
hsales2	24
huron	25
ibm	25
ibmclose	26
input	27
internet	27
invent15	28
jcars	28
kkong	29
labour	30
lynx	30
milk	31
mink	32
mortal	32
motel	33
motion	34
nail	34

oilprice	35
olympic	35
ozone	36
paris	37
pcv	37
petrol	38
pigs	39
plastics	39
pollution	40
productC	40
pulpprice	41
qelec	41
qsales	42
running	42
sales	43
schizo	43
shampoo	44
sheep	45
ship	45
shipex	46
strikes	46
telephone	47
texasgas	47
ukdeaths	48
usdeaths	49
uselec	49
ustreas	50
wagesuk	50
wheat	51
wn	51
wnoise	52
writing	52
Index	54

fma-package	<i>Data sets from "Forecasting: methods and applications" by Makridakis, Wheelwright and Hyndman (1998)</i>
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Description

All data sets from "Forecasting: methods and applications" by Makridakis, Wheelwright and Hyndman (Wiley, 3rd ed., 1998).

Author(s)

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References

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. <http://robjhyndman.com/forecasting>

advert	<i>Sales and advertising expenditure</i>
--------	--

Description

Monthly sales and advertising expenditure for an automotive parts company.

Usage

advert

Format

Data frame containing the following columns:

advert Monthly Advertising expenditure

sales Monthly sales volume

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 6.7. Exercise 8.1.

Examples

```
plot(sales ~ advert, data=advert)
```

advsales	<i>Sales volume and advertising expenditure</i>
----------	---

Description

Sales volume and advertising expenditure for a dietary weight control product.

Usage

advsales

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 8.

References

Blattberg and Jeuland (1981).

Examples

```
plot(advsales)
```

airpass

Monthly Airline Passenger Numbers 1949-1960

Description

The classic Box & Jenkins airline data. Monthly totals of international airline passengers (1949–1960).

Usage

```
airpass
```

Format

A monthly time series, in thousands.

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.4, Chapter 3, Exercise 4.7.

References

Box, Jenkins and Reinsel (1994) *Time series analysis: forecasting and control*, 3rd edition, Holden-Day: San Francisco. Series G.

Examples

```
plot(airpass)
seasonplot(airpass)
tsdisplay(airpass)
```

auto

Attributes of some US and Japanese automobiles

Description

Price, mileage, age and country of origin for 45 automobiles.

Usage

auto

Format

This data frame contains the following columns:

Model Name of model

Country Country of manufacture

Mileage Mileage per gallon

Price Price of car at time of measurement

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, Wiley: New York. Chapter 2.

References

Consumer Reports, April 1990, pp.235-255.

Examples

```
plot(Price ~ Mileage, data=auto, pch=19, col=2)
points(auto$Mileage[auto$Country=="USA"],
       auto$Price[auto$Country=="USA"], pch=19, col=4)
legend(30,25000,legend=c("USA","Japan"), pch=19, col=c(4,2))
```

bank	<i>Mutual savings bank deposits</i>
------	-------------------------------------

Description

Deposits in a mutual savings bank in a large metropolitan area.

Usage

bank

Format

Data frame containing the following columns:

EOM End of month balance

AAA Composite AAA bond rates

threefour US Government 3-4 year bonds

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 6.

Examples

```
plot(bank)
```

beer	<i>Monthly beer production</i>
------	--------------------------------

Description

Monthly Australian beer production: Jan 1991 – Aug 1995.

Usage

beer

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 2.

Examples

```
plot(beer)
seasonplot(beer)
tsdisplay(beer)
```

bicoal	<i>Annual bituminous coal production</i>
--------	--

Description

Annual bituminous coal production in the USA: 1920–1968.

Usage

```
bicoal
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.7.

Examples

```
tsdisplay(bicoal)
```

books	<i>Sales of paperback and hardcover books</i>
-------	---

Description

Daily sales of paperback and hardcover books at the same store.

Usage

```
books
```


Format

Bivariate time series containing the following columns:

Paperback Number of paperback sales each day

Hardcover Number of hardcover sales each day

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 4.5.

Examples

```
plot(books)
```

boston	<i>Monthly dollar volume of sales</i>
--------	---------------------------------------

Description

Monthly dollar volume of sales on Boston stock exchange and combined New York and American stock exchange. January 1967 – November 1969.

Usage

```
boston
```

Format

Bivariate time series containing the following columns:

nyase New York and American Stock Exchange dollar volume

bse Boston Stock Exchange dollar volume

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 6.5

References

McGee and Carleton (1970) Piecewise regression, *Journal of the American Statistical Association*, **65**, 1109–1124.

Examples

```
plot(boston)
```

bricksq	<i>Quarterly clay brick production</i>
---------	--

Description

Australian quarterly clay brick production: 1956–1994.

Usage

bricksq

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 1 and Exercise 2.3.

Examples

```
plot(bricksq)
seasonplot(bricksq)
tsdisplay(bricksq)
```

canadian	<i>Canadian unemployment rate</i>
----------	-----------------------------------

Description

Canadian unemployment rate as a percentage of the civilian labor force between 1974 and the third quarter of 1975.

Usage

canadian

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 4.1.

Examples

```
plot(canadian)
```

capital

Quarterly capital expenditure and appropriations

Description

Seasonally adjusted quarterly capital expenditure and appropriations in U.S. manufacturing: 1953–1974.

Usage

```
capital
```

Format

Bivariate time series containing the following columns:

capital Quarterly capital expenditure for US manufacturing.

appropriations Quarterly capital appropriations for US manufacturing.

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 8.

Examples

```
plot(capital)
```

cement

Cement composition and heat data

Description

Cement composition and heat data.

Usage

```
cement
```

Format

Data frame containing the following columns:

pc1 Percentage by weight of component 1

pc2 Percentage by weight of component 2

pc3 Percentage by weight of component 3

heat Heat emitted in calories per gram of cement.

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 6.4

Examples

```
plot(cement)
```

chicken

Price of chicken

Description

Price of chicken in US (constant dollars): 1924–1993.

Usage

```
chicken
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(chicken)
```

condmilk	<i>Condensed milk</i>
----------	-----------------------

Description

Manufacturer's Stocks of evaporated and sweetened condensed milk.

Usage

condmilk

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.5.

Examples

```
plot(condmilk)
seasonplot(condmilk)
tsdisplay(condmilk)
```

copper	<i>Copper price</i>
--------	---------------------

Description

Yearly copper prices, 1800–1997 (in constant 1997 dollars).

Usage

copper

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(copper)
```

copper1	<i>Copper prices</i>
---------	----------------------

Description

Monthly copper prices for 28 consecutive months (in constant 1997 dollars).

Usage

```
copper1
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(copper1)
```

copper2	<i>Copper prices</i>
---------	----------------------

Description

Yearly copper prices for 14 consecutive years (in constant 1997 dollars).

Usage

```
copper2
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(copper2)
```

`copper3`*Copper prices*

Description

Yearly copper prices for 43 consecutive years (in constant 1997 dollars).

Usage`copper3`**Format**

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples`plot(copper3)`

`cowtemp`*Temperature of a cow*

Description

Daily morning temperature of a cow. Measure at 6.30am for 75 consecutive mornings by counting chirps from a telemetric thermometer implanted in the cow. Data are chirps per 5-minute interval minus 800.

Usage`cowtemp`**Format**

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercises 2.3 and 2.4.

References

Velleman, Paul. (1981) *The ABC of EDA*, Duxbury Press.

Examples

```
plot(cowtemp)
tsdisplay(cowtemp)
```

cpimel	<i>Consumer price index</i>
--------	-----------------------------

Description

Quarterly CPI (consumer price index) for Victoria: Q1 1980 to Q2 1995.

Usage

```
cpimel
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 8.7.

Examples

```
tsdisplay(cpimel)
```

dexter	<i>Dexterity test and production ratings</i>
--------	--

Description

Scores on manual dexterity test and production ratings for 20 workers.

Usage

```
dexter
```


Format

Data frame containing the following columns:

score Test score for manual dexterity

production Production rating

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.4

Examples

```
plot(production~score, data=dexter, pch=19, col=3)
```

dj	<i>Dow-Jones index</i>
----	------------------------

Description

Dow-Jones index on 251 trading days ending 26 Aug 1994.

Usage

dj

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 7.

References

Brockwell and Davis (1996)

Examples

```
tsdisplay(dj)
```

dole	<i>Unemployment benefits in Australia</i>
------	---

Description

Monthly total of people on unemployment benefits in Australia (Jan 1965 – Jul 1992).

Usage

dole

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.3.

Examples

```
plot(dole)
tsdisplay(dole)
```

dowjones	<i>Dow-Jones index</i>
----------	------------------------

Description

Dow-Jones index, 28 Aug - 18 Dec 1972.

Usage

dowjones

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.7.

Examples

```
tsdisplay(dowjones)
```

econsumption	<i>Electricity consumption and temperature</i>
--------------	--

Description

Electricity consumption and maximum temperature for 12 randomly chosen days.

Usage

```
econsumption
```

Format

Data frame containing the following columns:

Mwh Daily electricity consumption (megawatt-hours)

temp Daily maximum temperature (degrees Celsius)

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.5

Examples

```
plot(Mwh ~ temp, data=econsumption, pch=19, col=4)
```

eggs	<i>Price of eggs</i>
------	----------------------

Description

Price of dozen eggs in US, 1900–1993, in constant dollars.

Usage

```
eggs
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(eggs)
```

eknives	<i>Sales of electric knives</i>
---------	---------------------------------

Description

Sales of electric knives: Jan 1991 - April 1992.

Usage

```
eknives
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 4.2.

Examples

```
plot(eknives)
```

elco	<i>Sales of Elco's laser printers</i>
------	---------------------------------------

Description

Sales of Elco's laser printers: 1992–1998.

Usage

```
elco
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 10.

Examples

```
plot(elco)
```

elec	<i>Electricity production</i>
------	-------------------------------

Description

Australian monthly electricity production: Jan 1956 – Aug 1995.

Usage

```
elec
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapters 1–2, 7.

Examples

```
plot(elec)  
seasonplot(elec)  
tsdisplay(elec)
```

expenditure	<i>Expenditure</i>
-------------	--------------------

Description

Expenditure for 12 supermarket customers.

Usage

```
expenditure
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 2.

Examples

```
hist(expenditure)
```

fancy	<i>Sales for a souvenir shop</i>
-------	----------------------------------

Description

Monthly sales for a souvenir shop on the wharf at a beach resort town in Queensland, Australia.

Usage

```
fancy
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.8.

Examples

```
plot(fancy)  
seasonplot(fancy)
```

french	<i>Industry index</i>
--------	-----------------------

Description

French index of industry.

Usage

```
french
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 4.4.

Examples

```
plot(french)
```

housing

Housing data

Description

Monthly housing starts, construction contracts and average new home mortgage rates (Jan 1983 - Oct 1989).

Usage

```
housing
```

Format

Trivariate time series containing the following columns:

hstarts Monthly housing starts (thousands of units)

construction Construction contracts (millions of dollars)

interest Average new home mortgage rates

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 8.

References

Survey of current business, US Department of Commerce, 1990.

Examples

```
plot(housing)
```

hsales

Sales of one-family houses

Description

Monthly sales of new one-family houses sold in the USA since 1973.

Usage

hsales

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 3.

References

US Census Bureau, Manufacturing and Construction Division

Examples

```
plot(hsales)
plot(stl(hsales,"periodic"),main="Sales of new one-family houses, USA")
```

hsales2

Sales of new one-family houses

Description

Sales of new one-family houses in the USA (Jan 1987 – Nov 1995).

Usage

hsales2

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.10.

Examples

```
plot(hsales2)
seasonplot(hsales2)
tsdisplay(hsales2)
```

huron	<i>Level of Lake Huron</i>
-------	----------------------------

Description

Level of Lake Huron in feet (reduced by 570 feet): 1875–1972.

Usage

```
huron
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 8.2.

Examples

```
plot(huron)
```

ibm	<i>IBM sales and profit</i>
-----	-----------------------------

Description

IBM sales and profit (1954-1984) and forecasts.

Usage

```
ibm
```

Format

Time series data

Sales IBM annual sales

Profit IBM annual profit

FSales Forecast of IBM sales made in 1984

FProfit Forecast of IBM profits made in 1984

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
par(mfrow=c(2,1))
plot(ibm[,1], xlim=c(1954,2000), ylim=c(0,200),
     ylab="Sales (billions of $)", xlab="Year", type="o")
lines(ibm[,3],col=2,type="o")
plot(ibm[,2], xlim=c(1954,2000), ylim=c(-10,30),
     ylab="Profits (billions of $)", xlab="Year", type="o")
lines(ibm[,4],col=2,type="o")
```

 ibmclose

Closing IBM stock price

Description

Daily closing IBM stock price.

Usage

```
ibmclose
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.2.

References

Box, Jenkins and Reinsel (1994) *Time series analysis: forecasting and control*, 3rd edition, Holden-Day: San Francisco.

Examples

```
tsdisplay(ibmclose)
```

input	<i>Input series</i>
-------	---------------------

Description

Input series for exercise 8.6.

Usage

```
input
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 8.6.

Examples

```
plot(input)
```

internet	<i>Number of internet users</i>
----------	---------------------------------

Description

Number of users logged on to an internet server each minute over a 100-minute period.

Usage

```
internet
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 7.

Examples

```
tsdisplay(internet)
```

invent15	<i>Inventory demand</i>
----------	-------------------------

Description

Inventory demand for product E15.

Usage

```
invent15
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.6. Also Chapter 4.

Examples

```
plot(invent15)
```

jcars	<i>Motor vehicle production</i>
-------	---------------------------------

Description

Japanese motor vehicle production in thousand (1947–1989).

Usage

```
jcars
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.8. Chapter 8.

References

World motor vehicle data, Motor Vehicle Manufacturers of US Inc, Detroit, 1991.

Examples

```
plot(jcars)
log.jcars <- BoxCox(jcars,0)
jcars.f <- holt(log.jcars)
plot(jcars.f)
```

kkong

King Kong data

Description

King Kong data.

Usage

kkong

Format

Data frame consisting of following columns

weight Weights of 21 gorillas

height Heights of 21 gorillas

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 5. Exercise 5.6.

Examples

```
plot(weight~height, data=kkong, pch=19, col=2)
```

labour	<i>Civilian labour force</i>
--------	------------------------------

Description

Number of persons in the civilian labour force in Australia each month (Feb 1978 - Aug 1995).

Usage

labour

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 3.8.

Examples

```
plot(labour)
labour.stl <- stl(labour,10)
plot(labour.stl)
monthplot(labour.stl$time.series[,1],type="h")
```

lynx	<i>Annual Canadian Lynx trappings 1821–1934</i>
------	---

Description

Annual number of lynx trapped in McKenzie river district of northwest Canada: 1821–1934.

Usage

lynx

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.3.

References

Campbell, M. J. and A. M. Walker (1977). A Survey of statistical work on the Mackenzie River series of annual Canadian lynx trappings for the years 1821–1934 and a new analysis. *Journal of the Royal Statistical Society series A*, **140**, 411–431.

Examples

```
plot(lynx)
tsdisplay(lynx)
```

milk	<i>Monthly milk production per cow</i>
------	--

Description

Average monthly milk production per cow over 14 years (January 1962 - December 1975).

Usage

```
milk
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 2.

References

Cryer (1986) *Time series analysis*, Duxbury Press: Belmont.

Examples

```
par(mfrow=c(2,1))
plot(milk,xlab="Year",ylab="pounds",
     main="Monthly milk production per cow")
milk.adj <- milk/monthdays(milk)*365.25/12
plot(milk.adj,xlab="Year",ylab="pounds",
     main="Adjusted monthly milk production per cow")
```

mink	<i>Number of minks trapped</i>
------	--------------------------------

Description

Annual number of minks trapped in McKenzie river district of northwest Canada: 1848–1911.

Usage

mink

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.4.

Examples

```
tsdisplay(mink)
```

mortal	<i>Mortality</i>
--------	------------------

Description

Bird mortality for 156 poultry farms, Aug 1995 - Jul 1996.

Usage

mortal

Format

Data frame containing the following columns:

typeA Percentage of Type A birds for each farm.

mortality Percentage mortality of all birds for each farm.

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.9

Examples

```
plot(mortality~typeA, data=mortal)
```

motel

Total accommodation at hotel, motel and guest house

Description

Total room nights occupied and total monthly takings from accommodation at hotel, motel and guest house in Victoria, Australia: Jan 1980 - June 1995.

Usage

```
motel
```

Format

Trivariate time series containing the following columns:

Roomnights Total room nights

Takings Total monthly takings (thousands of dollars)

CPI Quarterly CPI values

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 8.7.

Examples

```
plot(motel[,2], motel[,1], xlab="Room nights", ylab="Takings",  
     pch=19, col=4)
```

motion

Employment figures in the motion picture industry

Description

Monthly employment figures for the motion picture industry (SIC Code 78): Jan 1955 – Dec 1970.

Usage

motion

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.9.

References

"Employment and earnings, US 1909–1978", Department of Labor, 1979.

Examples

```
plot(motion)
seasonplot(motion)
tsdisplay(motion)
```

nail

Nail prices

Description

Nail prices, 1800–1996 in constant dollars.

Usage

nail

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(nail)
```

oilprice

Oil prices

Description

Oil prices in constant 1997 dollars: 1870–1997.

Usage

```
oilprice
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 10.

Examples

```
plot(oilprice)
```

olympic

Men's 400 m final winning times in each Olympic Games

Description

Winning times for the men's 400 m final in each Olympic Games: 1896–1996.

Usage

```
olympic
```

Format

Data frame containing the following columns:

Year Year of Olympics

time Winning time in 400m final

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.7

Examples

```
plot(time~Year, data=olympic, pch=19, col=3)
```

ozone

Ozone depletion and melanoma rates

Description

Ozone depletion and melanoma rates in various locations.

Usage

ozone

Format

Data frame containing the following columns:

ozonedep Ozone depletion rates as percentages

melanoma Melanoma rates as percentages

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.3.

Examples

```
plot(ozonedep~melanoma, data=ozone, pch=19, col=2)
```

paris	<i>Average temperature</i>
-------	----------------------------

Description

Average monthly temperature in Paris.

Usage

```
paris
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.1.

Examples

```
plot(paris)
seasonplot(paris)
tsdisplay(paris)
```

pcv	<i>GDP</i>
-----	------------

Description

GDP for Western Europe and PCV industry sales.

Usage

```
pcv
```

Format

Bivariate time series consisting of the following columns

GDP GDP Western Europe

PCV PCV Industry sales

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 5.

Examples

```
plot(PCV~GDP, data=pcv, pch=20, col=2)
```

petrol

Sales of petroleum and related product

Description

US monthly sales of petroleum and related product: Jan 1971 - Dec 1991.

Usage

```
petrol
```

Format

Multivariate time series data:

Chemicals Sales of chemicals and allied products

Coal Sales of Bituminous coal products

Petrol Sales of petroleum and coal products

Vehicles Sales of motor vehicles and parts

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 8.

Examples

```
plot(petrol)
```

pigs	<i>Number of pigs slaughtered</i>
------	-----------------------------------

Description

Monthly total number of pigs slaughtered in Victoria, Australia (Jan 1980 – Aug 1995).

Usage

```
pigs
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 7.

Examples

```
tsdisplay(pigs)
```

plastics	<i>Sales of plastic product</i>
----------	---------------------------------

Description

Monthly sales of product A for a plastics manufacturer.

Usage

```
plastics
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 3.5.

Examples

```
plot(plastics)
seasonplot(plastics)
plot(stl(plastics,"periodic"))
```

pollution	<i>Shipment of pollution equipment</i>
-----------	--

Description

Monthly shipments of pollution equipment (in thousands of French francs), Jan 1986 – Oct 1996.

Usage

pollution

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 7.

Examples

```
tsdisplay(pollution)
```

productC	<i>Sales of product C</i>
----------	---------------------------

Description

Sales of product C (a lubricant sold in large containers).

Usage

productC

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 1.

Examples

```
plot(productC)
```

pulpprice	<i>Pulp price and shipments</i>
-----------	---------------------------------

Description

World pulp price and shipments.

Usage

```
pulpprice
```

Format

Data frame consisting of following columns

shipments World pulp shipments

price World pulp price

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 5.

Examples

```
plot(shipments~price, data=pulpprice)
```

qelec	<i>Electricity production</i>
-------	-------------------------------

Description

Quarterly electricity production.

Usage

```
qelec
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 3.4.

Examples

```
plot(decompose(qelec))
```

qsales

Sales data

Description

Quarterly exports of a French company in thousands of francs.

Usage

```
qsales
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 3.7 and Table 4-7.

Examples

```
plot(qsales)
```

running

Running times and maximal aerobic capacity

Description

Running times and maximal aerobic capacity for 14 female runners.

Usage

```
running
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 2.5.

References

Conley, Krahenbuhl, Burkett and Millar (1981) Physiological correlates of female road racing performance, *Research Quarterly Exercise Sport*, **52**, 441–448.

Examples

```
plot(times~capacity, data=running, pch=19, col=2)
```

sales	<i>Sales data</i>
-------	-------------------

Description

Sales data over 10 time periods.

Usage

```
sales
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 5.

Examples

```
plot(sales,type="p")
abline(lsf(1:10,sales))
```

schizo	<i>Perceptual speed scores</i>
--------	--------------------------------

Description

Daily perceptual speed scores for a schizophrenic patient. The patient began receiving a powerful tranquilizer (chlorpromazine) on the 61st day and continued receiving the drug for the remainder of the sample period. It is expected that this drug would reduce perceptual speed.

Usage

```
schizo
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 8.8.

References

McCleary and Hay (1980).

Examples

```
plot(schizo)
```

shampoo

Sales of shampoo

Description

Sales of shampoo over a three year period.

Usage

```
shampoo
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 3.

Examples

```
plot(shampoo)
```

sheep	<i>Sheep population</i>
-------	-------------------------

Description

Sheep population (in millions) of England and Wales: 1867–1939.

Usage

sheep

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.6.

References

Kendall (1976).

Examples

```
tsdisplay(sheep)
```

ship	<i>Electric can opener shipments</i>
------	--------------------------------------

Description

Electric can opener shipments.

Usage

ship

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 4. Exercise 4.6.

Examples

```
plot(ship)
```

shipex	<i>Shipments</i>
--------	------------------

Description

Shipments

Usage

```
shipex
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 3.1

Examples

```
plot(shipex)
```

strikes	<i>Number of strikes</i>
---------	--------------------------

Description

Number of strikes in the US from 1951 to 1980.

Usage

```
strikes
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.4

References

Brockwell and Davis (1991)

Examples

```
tsdisplay(strikes)
```

telephone	<i>Telephone cost</i>
-----------	-----------------------

Description

Telephone cost in San Francisco, New York: 1915–1996.

Usage

```
telephone
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(telephone)
```

texasgas	<i>Price and consumption of natural gas</i>
----------	---

Description

Price and per capita consumption of natural gas in 20 towns in Texas.

Usage

```
texasgas
```

Format

Data frame containing the following columns:

price Average price in cents per thousand cubic feet

consumption Consumption per customer in thousand cubic feet.

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 5.10. Exercise 6.2.

Examples

```
plot(consumption ~ price, data=texasgas)
```

ukdeaths

Total deaths and serious injuries

Description

Monthly total deaths and serious injuries on UK roads: Jan 1975 – Dec 1984. In February 1983, new legislation came into force requiring seat belts to be worn.

Usage

```
ukdeaths
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 8.

References

Harvey (1989)

Examples

```
plot(ukdeaths)
seasonplot(ukdeaths)
tsdisplay(ukdeaths)
```

usdeaths	<i>Accidental deaths in USA</i>
----------	---------------------------------

Description

Monthly accidental deaths in USA.

Usage

```
usdeaths
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercises 2.3 and 2.4.

Examples

```
plot(usdeaths)
seasonplot(usdeaths)
tsdisplay(usdeaths)
```

uselec	<i>Total generation of electricity</i>
--------	--

Description

Monthly total generation of electricity by the U.S. electric industry (Jan 1985 - Oct 1996).

Usage

```
uselec
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.8.

Examples

```
plot(uselec)
seasonplot(uselec)
tsdisplay(uselec)
```

ustreas	<i>Treasury bill contracts</i>
---------	--------------------------------

Description

US treasury bill contracts on the Chicago market for 100 consecutive trading days in 1981.

Usage

```
ustreas
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 1.

Examples

```
plot(ustreas)
tsdisplay(ustreas)
```

wagesuk	<i>Real daily wages</i>
---------	-------------------------

Description

Real daily wages in pound, England: 1260–1994.

Usage

```
wagesuk
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(wagesuk)
```

wheat	<i>Wheat prices</i>
-------	---------------------

Description

Wheat prices in constant 1996 pounds: 1264–1996.

Usage

```
wheat
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 9.

Examples

```
plot(wheat)
```

wn	<i>White noise series</i>
----	---------------------------

Description

White noise series.

Usage

```
wn
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Exercise 7.3.

Examples

```
tsdisplay(wn)
```

wnoise	<i>White noise time series</i>
--------	--------------------------------

Description

White noise time series with 36 values.

Usage

```
wnoise
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 7.

Examples

```
tsdisplay(wnoise)
```

writing	<i>Sales of printing and writing paper</i>
---------	--

Description

Industry sales for printing and writing paper (in thousands of French francs): Jan 1963 – Dec 1972.

Usage

```
writing
```

Format

Time series data

Source

Makridakis, Wheelwright and Hyndman (1998) *Forecasting: methods and applications*, John Wiley & Sons: New York. Chapter 7.

Examples

```
tsdisplay(writing)
seasonplot(writing)
```

Index

*Topic **datasets**

advert, 4
advsales, 4
airpass, 5
auto, 6
bank, 7
beer, 7
bicoal, 8
books, 8
boston, 9
bricksq, 10
canadian, 10
capital, 11
cement, 11
chicken, 12
condmilk, 13
copper, 13
copper1, 14
copper2, 14
copper3, 15
cowtemp, 15
cpimel, 16
dexter, 16
dj, 17
dole, 18
dowjones, 18
econsumption, 19
eggs, 19
eknives, 20
elco, 20
elec, 21
expenditure, 21
fancy, 22
french, 22
housing, 23
hsales, 24
hsales2, 24
huron, 25
ibm, 25
ibmclose, 26
input, 27
internet, 27
invent15, 28
jcars, 28
kkong, 29
labour, 30
lynx, 30
milk, 31
mink, 32
mortal, 32
motel, 33
motion, 34
nail, 34
oilprice, 35
olympic, 35
ozone, 36
paris, 37
pcv, 37
petrol, 38
pigs, 39
plastics, 39
pollution, 40
productC, 40
pulpprice, 41
qelec, 41
qsales, 42
running, 42
sales, 43
schizo, 43
shampoo, 44
sheep, 45
ship, 45
shipex, 46
strikes, 46
telephone, 47
texasgas, 47
ukdeaths, 48
usdeaths, 49

- uselec, 49
- ustreas, 50
- wagesuk, 50
- wheat, 51
- wn, 51
- wnoise, 52
- writing, 52
- *Topic **package**
 - fma-package, 3

- advert, 4
- advsales, 4
- airpass, 5
- auto, 6

- bank, 7
- beer, 7
- bicoal, 8
- books, 8
- boston, 9
- bricksq, 10

- canadian, 10
- capital, 11
- cement, 11
- chicken, 12
- condmilk, 13
- copper, 13
- copper1, 14
- copper2, 14
- copper3, 15
- cowtemp, 15
- cpimel, 16

- dexter, 16
- dj, 17
- dole, 18
- dowjones, 18

- econsumption, 19
- eggs, 19
- eknives, 20
- elco, 20
- elec, 21
- expenditure, 21

- fancy, 22
- fma (fma-package), 3
- fma-package, 3
- french, 22

- housing, 23
- hsales, 24
- hsales2, 24
- huron, 25

- ibm, 25
- ibmclose, 26
- input, 27
- internet, 27
- invent15, 28

- jcars, 28

- kkong, 29

- labour, 30
- lynx, 30

- milk, 31
- mink, 32
- mortal, 32
- motel, 33
- motion, 34

- nail, 34

- oilprice, 35
- olympic, 35
- ozone, 36

- paris, 37
- pcv, 37
- petrol, 38
- pigs, 39
- plastics, 39
- pollution, 40
- productC, 40
- pulpprice, 41

- qelec, 41
- qsales, 42

- running, 42

- sales, 43
- schizo, 43
- shampoo, 44
- sheep, 45
- ship, 45
- shipex, 46
- strikes, 46

telephone, [47](#)
texasgas, [47](#)

ukdeaths, [48](#)
usdeaths, [49](#)
uselec, [49](#)
ustreas, [50](#)

wagesuk, [50](#)
wheat, [51](#)
wn, [51](#)
wnoise, [52](#)
writing, [52](#)