Package ‘fds’

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Author Han Lin Shang and Rob J Hyndman
Maintainer Han Lin Shang <hanlin.shang@anu.edu.au>
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Description

This package contains a list of functional time series, sliced functional time series, and functional data sets. Functional time series is a special type of functional data observed over time. Sliced functional time series is a special type of functional time series with a time variable observed over time.

Author(s)

Han Lin Shang and Rob J Hyndman
Maintainer: Han Lin Shang <hanlin.shang@anu.edu.au>

References


Description

Age-specific mortality rates for Australia and Australian states.

Format

An object of class fts.
Details

The following data sets are included:

- wamale: Western Australia male log mortality rates (1901-2003).
- watotal: Western Australia total log mortality rates (1901-2003).

Mortality rates are in logarithm form for Australia, New South Wales, Victoria, Queensland, South Australia, and Western Australia.

Mortality rates without log transformation are: Northern Territory, Australian Captial Territory and Tasmania. These three states have either missing data or zero mortality rates.

All data are from v3.2b of the Australian Demographic Data Bank released 10 February 2005.

Author(s)

Rob J Hyndman
Source

The Australian Demographic Data Bank (courtesy of Len Smith).

References


Examples

```r
plot(victotal)
```

### Biscuit

**Biscuit dough piece data**

Description

The experiment involved varying the composition of biscuit dough pieces. Two sets of dough pieces were measured, a calibration set and a prediction set. They were created and measured as two distinct sets, on separate occasions, and do not result from a random (or any other) split of a larger set.

Usage

```r
data(labp)
data(labc)
data(nirp)
data(nirc)
```

Format

- `nirp` and `nirc` are objects of class `fds`.
- `labp` and `labc` are objects of class `matrix`. 
Details

The data labc (c stands for calibration) and labp (p stands for prediction) contain the reference data on the composition of the doughs.

The data nirc and nirp contain 700 point near infrared reflectance (NIR) spectra for the same dough. The spectral range is 1100-2498 nm in steps of 2nm.

The data labc$y$ is 4 rows by 40 columns, the rows being fat, sucrose, flour and water all in percents. The percents do not quite add up to 100, since there are other minor ingredients present, but they add up to nearly 100 percent.

According to Brown et al. (2001), the observation 23 in the calibration set appears as an outlier.

Sample number 21 in the labp shows up as a validation set.

Note

We thank Professor Marina Vannucci for the permission to re-distribute this data set.

References


Examples

```r
plot(nirp)
plot(nirc)
```

---

### Cancerrate

**Breast Cancer Data**

**Description**

Age-specific breast cancer rates for Australian females with 9 age groups (45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85+) from 1921 to 2001.

**Usage**

data(Cancerrate)

**Format**

An object of class fts.

**Source**

References


Examples

```r
plot(Cancerrate)
```

---

| ECBYieldcurve | Yield curve data spot rate |

**Description**

Provided by European Central Bank, this data set contains daily yield curve spot rate from 29/12/2006 to 24/07/2009 for government bond, nominal, all triple AAA issued companies, with maturity term at 3, 6 months and 1 to 30 years.

**Usage**

```r
data(ECBYieldcurve)
```

**Format**

An object of class `fts`.

**Note**

We thank Mr Sergio S. Guirreri for the permission to re-distribute this data set.

**Source**


**Examples**

```r
plot(ECBYieldcurve)
```
Electricity consumption

Electricity consumption time series

Description

This set of time series focus on the US monthly electricity consumed by the residential and commercial sectors from January 1973 up to February 2001 (336 months). This data set is a part of the original one which can be found at http://www.economagic.com.

Usage

data(Electricityconsumption)

Format

An object of class sfts.

Details

We eliminated the heteroscedasticity and the linear trend by differencing the log transformed data.

Note

We thank Professor Frederic Ferraty for the permission to re-distribute this data set.

Source


References


Examples

plot(Electricityconsumption)
Electricity demand

Description

These data sets consist of half-hourly electricity demands from Sunday to Saturday in Adelaide between 6/7/1997 and 31/3/2007.

Usage

data(mondaydemand)
data(tuesdaydemand)
data(wednesdaydemand)
data(thursdaydemand)
data(fridaydemand)
data(saturdaydemand)
data(sundaydemand)
data(SAelectdemand)

Format

An object of class sfts.

Details

In Adelaide, the electricity demands in summer are very volatile and highly dependent on their associated temperatures. Analyses were performed to test whether or not, under different temperature scenarios, there will be enough capacity to satisfy the electricity demands.

References


Examples

plot(mondaydemand)
plot(tuesdaydemand)
plot(wednesdaydemand)
plot(thursdaydemand)
plot(fridaydemand)
plot(saturdaydemand)
plot(sundaydemand)
plot(SAelectdemand)
Fat content spectrometric data

Description

This data set is a part of the original one which can be found at http://lib.stat.cmu.edu/datasets/tecator.

Usage

data(Fatspectrum)
data(Fatvalues)

Format

Fatspectrum is an object of class fds.
Fatvalues is a numeric object.

Details

For each unit, we observe one spectrometric curve which corresponds to the absorbance measured at 100 wavelengths (from 852 to 1050 in step of 2nm). For each measurement, we have at hand its fat content obtained by an analytic chemical processing.

Note

We thank Professor Frederic Ferraty for the permission to re-distribute this data set.

Source


References


**Examples**

```r
plot(Fatspectrum)
```

---

**FedYieldcurve**  
*Federal Reserve interest rate*

**Description**

This data set contains monthly interest rate of the Federal Reserve from January 1982 to June 2009.

**Usage**

```r
data(FedYieldcurve)
```

**Format**

An object of class `fts`.

**Note**

We thank Mr Sergio S. Guirrerì for the permission to re-distribute this data set.

**Source**


**Examples**

```r
plot(FedYieldcurve)
```
Function to read a bundle of data sets from the Human Mortality Database

Description

This function returns a list of relevant demographic data currently available in the HMD, related to a specified country.

Usage

hmdcountry(Country, sex, username, password)

Arguments

Country
A specified country.

sex
Possible options are "Male", "Female", "Total".

username
Authenticate username.

password
Authenticate password.

Details

In order to read the data sets, users are required to create their account via the HMD website (http://www.mortality.org/), and obtain a valid username and password.

Value

List of objects of class fts.

Author(s)

Han Lin Shang and Rob J Hyndman

See Also

read.hmd, hmdstatistic
hmdstatistic  

Function to read a bundle of data sets from the Human Mortality Database

Description

This function returns a list of all the countries currently available in the HMD, related to a specified data type.

Usage

```
hmdstatistic(sex, type = c("birth count", "death count", "population", "exposure", "mortality rate", "life expectancy"), username, password)
```

Arguments

- **sex**: Possible options are "Male", "Female", "Total".
- **type**: Type of data.
- **username**: Authenticate username.
- **password**: Authenticate password.

Details

In order to read the data sets, users are required to create their account via the HMD website (http://www.mortality.org/), and obtain a valid username and password.

Value

List of objects of class fts.

Author(s)

Han Lin Shang and Rob J Hyndman

See Also

`read.hmd`, `hmdcountry`
Moisture content spectrometric data

Description
This data set consists of near-infrared reflectance spectra of 100 wheat samples, measured in 2 nm intervals from 1100 to 2500nm, and an associated response variable, the samples’ moisture content.

Usage

data(Moisturespectrum)
data(Moisturevalues)

Format
Moisturespectrum is an object of class fds.
Moisturevalues is a numeric object.

Note
We thank Professor John Kalivas for the permission to re-distribute this data set.

References

Examples
plot(Moisturespectrum)
Octane content spectrometric data

Description

This data set comprises spectra from 60 gasoline samples, measured in 2 nm intervals from 900 to 1700 nm. The response variable is the octane numbers of the samples.

Usage

data(Octanespectrum)
data(Octanevalues)

Format

Octanespectrum is an object of class \texttt{fds}.

Octanevalues is a numeric object.

Note

We thank Professor John Kalivas for the permission to re-distribute this data set.

References


Examples

plot(Octanespectrum)

Phoneme data

Description

This data set was formed by selecting five phonemes for classification based on digitized speech. There are $n = 2000$ pairs $(x_i, y_i)_{i=1,\ldots,n}$, where $x_i$ corresponds to the discretized log-periodograms whereas the $y_i$ gives the class membership (five phonemes: aa, ao, dcl, iy, sh).
Usage

data(aa)
data(ao)
data(dcl)
data(iy)
data(sh)

Format

An object of class \texttt{fds}.

Details

The phonemes are transcribed as follows: "sh" as in "she", "dcl" as in "dark", "iy" as the vowel in "she", "aa" as the vowel in "dark", and "ao" as the first vowel in "water".

Note

We thank Professor Frederic Ferraty for the permission to re-distribute this data set.

Source

This data set is a part of the original one from the elements of statistical learning website at \url{http://www-stat.stanford.edu/ElemStatLearn}.

This data set can also be found at the NonParametric Functional Data Analysis website (\url{http://www.lsp.ups-tlse.fr/staph/npfda/}).

References


Examples

plot(aa)
plot(ao)
plot(dcl)
plot(iy)
plot(sh)
Description

The pig weight data set has 9 repeated weight measures on 48 pigs.

Usage

```
data(Pigweight)
```

Format

An object of class `fds`.

Details

- `Pigweight$x`: Number of weeks since measurements commenced.
- `Pigweight$y`: Bodyweight(kg) of pig after weeks.

Note

We thank Professor Matt Wand for the permission to re-distribute this data set.

Source


References


Examples

```
plot(Pigweight)
```
Function to read data sets from the Human Mortality Database

Description

This function allows users to read any data set from the Human Mortality Database (HMD).

Usage

read.hmd(country, sex, file = "Mx_1x1.txt", username, password, yname)

Arguments

country     Directory abbreviation from the HMD. For instance, Australia = "AUS".
sex         Possible options are "Male", "Female", "Total".
file        Directory abbreviation from the HMD. For instance, mortality rate = "Mx_1x1.txt".
username    Authenticate username.
password    Authenticate password.
yname       Type of data.

Details

In order to read the data sets, users are required to create their account via the HMD website (http://www.mortality.org/), and obtain a valid username and password.

Value

An object of class fts.

Author(s)

Han Lin Shang and Rob J Hyndman

See Also

hmdstatistic, hmdcountry
Description

The data were registered by the satellite topex/poseidon around an area of 25 kilometers upon the Amazon River. Each row of the data matrix is represented by its wave (i.e. curve) on the range (0, 70), and the satellite is registering 10 curves each second.

Usage

data(Satellite)

Format

An object of class `fds`.

Details

Note that each wave is linked with the kind of ground treated by the satellite, and the idea for the Amazonian basin is to use these waveforms for altimetric and hydrological purposes.

Note

We thank Professor Frederic Ferraty for the permission to re-distribute this data set.

Source


This data set can also be found at the NonParametric Functional Data Analysis website (http://www.lsp.ups-tlse.fr/staph/npfda/).

References


Examples

plot(Satellite)
Temperatures in South Australia

Description

These data sets consist of half-hourly temperatures measured at Kent Town and Adelaide airport from Sunday to Saturday in Adelaide between 6/7/1997 and 31/3/2007.

Usage

```r
data(mondaytempkent)
data(mondaytempairport)
data(tuesdaytempkent)
data(tuesdaytempairport)
data(wednesdaytempkent)
data(wednesdaytempairport)
data(thursdaytempkent)
data(thursdaytempairport)
data(fridaytempkent)
data(fridaytempairport)
data(saturdaytempkent)
data(saturdaytempairport)
data(sundaytempkent)
data(sundaytempairport)
data(tempkent)
data(tempairport)
```

Format

An object of class sfts.

Details

In Adelaide, the electricity demands in summer are very volatile and highly dependent on their associated temperatures. Analyses were performed to test whether, under different temperature scenarios, there will be enough capacity to satisfy the demands.

Source


Examples

```r
plot(mondaytempkent)
plot(tuesdaytempkent)
plot(wednesdaytempkent)
plot(thursdaytempkent)
```
Spanishmigration

Spanish migration from 1999 to 2003

Description

This data set consists of migration number (in thousands) in Spain from 1999 to 2003. This data set contains the migration rates of 9 age groups, namely 0-9, 10-15, 16-19, 20-29, 30-39, 40-49, 50-59, 60-65, and 65+ for both females and males.

Usage

data(femalemigration)
data(malemigration)

Format

An object of class fts.

SOI

Annual Southern Oscillation Index (SOI) for the period 1900-2004.

Description

Annual measures on Southern Oscillation Index (SOI): observed annual cycles in period 1900-2004.

Usage

data(SOI)

Format

An object of class fts.

Source

The data are available at the Australian Meteorological Office (http://www.environment.gov.au).

Examples

plot(SOI)
Details

This data set was calculated at the time in accordance with the European studies of population (EAPS https://www.eaps.nl) methodology of 2002, which is heterogeneous with the results calculated using the methodology EAPS in 2005.

Source


References


Examples

plot(femalemigration)
plot(malemigration)

Yieldcurve

US: Treasury bond

Description

This data set contains monthly US Treasury bonds from January 1970 through December 2002. Based on the bid-ask midpoint average, the data consist of end of the month price quotes.

Usage

data(Yieldcurve)

Format

An object of class fts.

Details

This data set is filtered to eliminate bonds with special option futures, such as callable and flower bonds. Illiquid securities, such as treasury bills with less than one month on maturity and treasury notes and bonds with less than one year to maturity, are excluded from the samples.

Source


Examples

plot(Yieldcurve)
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