Package 'datana'

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Title Datasets and Functions to Accompany Analisis De Datos Con R

Description Datasets and functions to accompany the book 'Analisis de datos con el programa estadistico R: una introduccion aplicada' by Salas-Eljatib (2021, ISBN: 9789566086109). The package helps carry out data management, exploratory analyses, and model fitting.

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URL https://eljatib.com/rlibro

Depends R (>= 3.5.0)

Imports lattice, ggplot2, stats, graphics, methods

Suggests foreign, gdata, car, agricolae, multcomp

Encoding UTF-8

Language en-US

RoxygenNote 7.3.2

BuildResaveData best

LazyData true

LazyDataCompression xz

NeedsCompilation no

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Contents

datana-package *Datasets and Functions to Accompany Analisis De Datos Con R*

Description

The datana package provides the datasets and functions that accompany the book "Análisis de datos con el programa estadístico R: una introducción aplicada" by Salas-Eljatib (2021, ISBN: 9789566086109). You can visit the book's website at https://eljatib.com/rlibro.

Notice that most of the available dataframes have a counterpart with column names in Spanish. For instance, the dataframe 'crown' has column names in English, but 'crown2' has column names in Spanish. Both data frames have the same data.

Details

The package contains several datasets for exploratory data analysis in an array of disciplines. Furthermore, datana provides functions as tools for descriptive statistics and plotting.

To see the preferable citation of the package, type citation("datana").

Author(s)

NA

Maintainer: NA

Christian Salas-Eljatib is also indebted to several people who have contributed to individual data frames and functions: see credits in help pages.

References

Salas-Eljatib C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Santiago, Chile: Ediciones Universidad Mayor. ISBN: 9789566086109. https://www.buscalibre.cl/libro-analisis-de-datos-con-el-programa-estadistico-r/9789566086109/p/53775485

Examples

```
##Scatter-plot and marginal histograms
data(treevolroble)
df <- treevolroble
xyhist(x=df$dbh,y=df$toth, xlab="Diameter (cm)",  ylab="Height (m)")

##Scatter-plot and box-plots
data(fishgrowth)
df <- fishgrowth
xyboxplot(x=df$length,y=df$scale)
```

aboutrsq *About the R-Squared statistics: the Anscombe quartet dataset*

Description

A dataset that contains four pairs of columns with the same descriptive statistics; however, there is a difference when representing the points through a graph.

Usage

```
data(aboutrsq)
```

Format

The data frame contains four variables as follows:

X1 Integers values that represent X-axis for Y1, Y2 and Y3 column

Y1 Float values that represent Y-axis for X1 column

Y2 Float values that represent Y-axis for X1 column

Y3 Float values that represent Y-axis for X1 column

X2 Integers values that represent X-axis for Y4 column

Y4 Float values that represent Y-axis for X2 column

Source

Data were assembled by Dr Christian Salas-Eljatib (Santiago, Chile).

References

Anscombe FJ. 1973. Graphs in statistical analysis. The American Statistician 27:17-21. doi: 10.2307/2682899

Examples

```
data(aboutrsq)
head(aboutrsq)
```

aboutrsq2 *Sobre el estadístico R2: los datos del cuarteto de Anscombe*

Description

Dataset que contiene cuatro pares de columnas con la mismos estadísticos descriptivos, sin embargo, si existe diferencia al representar los puntos mediante un gráfico.

Usage

```
data(aboutrsq2)
```

Format

Variables se describen a continuación::

X1 Valores enteros que representan el eje X para las columnas Y1, Y2 e Y3

Y1 Valores flotantes que representan el eje Y para la columna X1

Y2 Valores flotantes que representan el eje Y para la columna X1

Y3 Valores flotantes que representan el eje Y para la columna X1

X2 Valores enteros que representan el eje X para las columnas Y4

Y4 Valores flotantes que representan el eje Y para la columna X2

Source

Datos fueron contribuidos por el Prof. Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

References

Anscombe FJ. 1973. Graphs in statistical analysis. The American Statistician 27:17-21. doi: 10.2307/2682899

Examples

```
data(aboutrsq2)
head(aboutrsq2)
```

`airquality` *Airquality data in New York city.*

Description

Daily air quality measurements in New York, May to September 1973.

Usage

```
data(airquality)
```

Format

Contains 6 variables, as follows:

ozone numeric Ozone (ppb).

solar numeric Solar R (lang).

wind numeric Wind (mph).

temp numeric Temperature (degrees F).

month numeric Month (1–12).

day numeric Day of month (1–31).

Source

The data were obtained from the library $datasets$.

References

Chambers J, Cleveland W, Kleiner B, Tukey P. 1983. Graphical Methods for Data Analysis. Belmont. CA: Wadsworth.

Examples

```
data(airquality)
head(airquality)
```

`airquality2` *Calidad del aire en la ciudad de Nueva York.*

Description

Calidad del aire diario medido en New York, de Mayo a Septiembre de 1973.

Usage

```
data(airquality2)
```

Format

Contiene 6 variables:

ozone Ozono (ppb).

solar Solar R (largo).

wind Viento (mph).

temp Temperatura (grados F).

month Mes del año (1–12).

day Dia del mes (1–31).

Source

Los datos fueron obtenidos desde la librería 'datasets'.

References

Chambers J, Cleveland W, Kleiner B, Tukey P. 1983. Graphical Methods for Data Analysis. Belmont. CA: Wadsworth.

Examples

```
data(airquality2)
head(airquality2)
```

annualppCities — *Time series of annual precipitations in cities of Chile.*

Description

Data contains annual precipitations in six cities in Chile (Santiago, Talca, Chillán, Temuco, Valdivia, and Puerto Montt) at different years.

Usage

```
data(annualppCities)
```

Format

The dataframe contains three variables as follows:

city Name of city.

year Year of registry.

annual Value of the annual precipitation of a given year (mm).

Source

The data were obtained from https://explorador.cr2.cl/.

Examples

```
data(annualppCities)
head(annualppCities)
```

annualppCities2 — *Serie de tiempo de precipitaciones anuales en Chile.*

Description

Data contains annual precipitations in six cities in Chile (Santiago, Talca, Chillan, Temuco, Valdivia, and Puerto Montt) at different years.

Usage

```
data(annualppCities2)
```

Format

The dataframe contains three variables as follows:

ciudad Name of city.

anho Year of registry.

pp.anual Value of the annual precipitation of a given year (mm).

Source

Los datos fueron obtenidos desde https://explorador.cr2.cl/.

Examples

```
data(annualppCities2)
head(annualppCities2)
```

`araucaria` *Contains plot-level variables in Araucaria araucana forests in Chile.*

Description

These are stand variables data from Araucaria araucana forests in southern Chile, measured in 2009. The data was based on fixed-area plots of 1000 m^2. There are two forest stands.

Usage

```
data(araucaria)
```

Format

Contains plot-level variables as follows:

stand Stand number.

plot.no Plot sample identificator number.

x.utm UTM coordinate in X-axis, in km.

y.utm UTM coordinate in Y-axis, in km.

slope Slope, in %.

aspect Aspect, in degrees.

eleva Elevation, in msnm.

nha Tree density, in trees/ha.

gha Basal area, in m^2/ha.

hdom Dominant height, in m.

vha Gross stand volume, in m^3/ha.

dg Diameter of the average basal area tree of the plot, in cm.

Source

The data are provided courtesy of Dr Nelson Ojeda at Universidad de La Frontera (Temuco, Chile).

References

Salas C, Ene L, Ojeda N, Soto H. 2010. Metodos estadísticos parametricos y no parametricos para predecir variables de rodal basados en Landsat ETM+: una comparacion en un bosque de Araucaria araucana en Chile [Parametric and non-parametric statistical methods for predicting plotwise variables based on Landsat ETM+: a comparison in an Araucaria araucana forest in Chile]. Bosque 31(3): 179-194. doi: 10.4067/S0717920020100003000002

Examples

```
data(araucaria)
head(araucaria)
```

`araucaria2` *Variables a nivel de parcela para bosques de Araucaria araucana en Chile.*

Description

Estos son variables a nivel de parcela para bosques Araucaria araucana en el centro-sur de Chile, medidos en 2009. Estas variables se basan en mediciones realizadas en parcelas de muestreo de 1000 m^2. Hay dos rodales.

Usage

```
data(araucaria)
```

Format

Contiene las siguientes variables:

rodal Rodal, con un número indentificador.

parce Parcela de muestreo, con un número indentificador.

x.utm Coordenada UTM en el eje X, en km.

y.utm Coordenada UTM en el eje Y, en km.

pendiente Pendiente, en %

exposicion Exposición del terreno, en grados.

altitud Altitud, en msnm.

nha Densidad, en arb/ha.

gha Área basal, en m^2/ha.

hdom Altura dominante, en m.

vha Volumen bruto, en m^3/ha.

dg Diámetro del árbol de área basal media, en cm.

Source

Los datos a nivel de árbol fueron cedidos por el Dr. Nelson Ojeda de la Universidad de La Frontera (Temuco, Chile).

References

Salas C, Ene L, Ojeda N, Soto H. 2010. Metodos estadísticos parametricos y no parametricos para predecir variables de rodal basados en Landsat ETM+: una comparacion en un bosque de Araucaria araucana en Chile. Bosque 31(3): 179-194. doi: 10.4067/S0717920020100003000002

Examples

```
data(araucaria2)
head(araucaria2)
```

---

baitreeline *Annual basal area increment for four tree species.*

Description

The dataset contains 157 observations of the last ten years in 6-8 adult trees of different species at three elevations of altitudinal gradients sampled in four locations in Chile and two in Spain.

Usage

```
data(baitreeline)
```

Format

Contains seven columns, as follows:

climate Climate of each location, mediterranean and temperate.

site Name of Location of study (termmas:Termas de Chillan , antillanca:Antillanca area within Puyehue National Park, castillo:Cerro Castillo Natural Reserve, farellones:Farellones in Central Chile, pyrenees: Sierra de Cutas area in Spanish Central Pyrenees, sierra:Sierra Nevada).

species name species of study (lenga: Nothofagus pumilio, frangel: Kageneckia angustifolia, uncinata: Pinus uncinata, sylvestris: Pinus sylvestris).

elevation Type of elevation. "Treeline", intermediate named as "inter", and closed or montane forest named as low.

tree Id for tree.

bai Value of annual basal area increment.

mean.bai Mean of annual basal area increment.

Source

The data were obtained from the DRYAD repository at doi: 10.5061/dryad.ks97h.

References

Piper F, Vinegla B, Linares J, Camarero J, Cavieres L, Fajardo A. 2016. Mediterranean and temperate treelines are controlled by different environmental drivers. Journal of of Ecology. 104: 691-702.

Examples

```
data(baitreeline)
head(baitreeline)
```

`baitreeline2` *Incremento anual en area basal de cuatro especies arboreas.*

Description

Este set de datps contiene 157 observaciones, de los ultimos 10 años en 6-8 árboles adultos de cuatro especies en un gradiente altitudinal. Las muestras se distribuyeron en cuatro localidades o sitios de Chile y dos en España.

Usage

```
data(baitreeline2)
```

Format

Contains seven columns, as follows:

clima Climate of each location, mediterranean and temperate.

sitio Name of Location of study (termmas:Termas de Chillan, antillanca:Antillanca area within Puyehue National Park, castillo:Cerro Castillo Natural Reserve, farellones:Farellones in Central Chile, pyrenees: Sierra de Cutas area in Spanish Central Pyrenees, sierra:Sierra Nevada).

especie name species of study (lenga: Nothofagus pumilio, frangel: Kageneckia angustifolia, uncinata: Pinus uncinata, sylvestris: Pinus sylvestris).

tipo.altitud Type of elevation. "Treeline", intermediate named as "inter", and closed or montane forest named as low.

arbol Id for tree.

bai Value of annual basal area increment.

bai.medio Mean of annual basal area increment.

Source

The data were obtained from the DRYAD repository at doi: 10.5061/dryad.ks97h.

References

Piper F, Vinegla B, Linares J, Camarero J, Cavieres L, Fajardo A. 2016. Mediterranean and temperate treelines are controlled by different environmental drivers. Journal of Ecology 104: 691-702.

Examples

```
data(baitreeline2)
head(baitreeline2)
```

`bears` *Age and physical measurement data for wild bears*

Description

Wild bears were anesthetized, and their bodies were measured and weighed. One goal of the study was to make a table (or perhaps a set of tables) for people interested in estimating the weight of a bear based on other measurements. Notice that there are missing values for some of the variables.

Usage

```
data(bears)
```

Format

Contains individual-level variables, as follows:

id Bear id

age Age in total number of months.

month Month number within a given year.

sex 1 =male, 2 = female.

headL Length of head, in cm.

headW Width of head, in cm.

neckG Girth of neck, in cm.

length Body length, in cm.

chestG Girth of chest, in cm.

weight body weight, in kg.

obs Temporal observation number for bear.

name Name given to bear.

Source

According to Prof. Timothy Gregoire at Yale University (New Haven, CT, USA), the data set was supplied by Gary Alt.

References

Entertaining references are in Reader's Digest April, 1979, and Sports Afield September, 1981.

Examples

```
data(bears)
head(bears)
table(bears$sex)
boxplot(headL~sex, data=bears)
```

---

bears2 *Edad y características biométricas de osos salvajes*

Description

Los osos salvajes fueron anestesiados y sus cuerpos medidos. Uno de los objetivos del estudio fue hacer una tabla (o quizas un conjunto de tablas) para las personas interesadas en estimar el peso de un oso basandose en otras medidas. Observe que faltan valores para algunas de las variables.

Usage

```
data(bears2)
```

Format

Contiene variables de nivel individual, como se describen a continuación:

id Identificador del oso.

edad edad en meses

mes identificador del mes,dentro del año.

sexo 1 = macho, 2 = hembra

cabezaL longitud de la cabeza, en cm

cabezaA ancho de la cabeza, en cm

cuelloP circunferencia del cuello, en cm

largo longitud del cuerpo, en cm

pechoG circunferencia del pecho, en cm

peso peso corporal, en kg

obs número de observación temporal para el oso

nombre nombre dado al oso

Source

Segun el Prof. Timothy Gregoire de Yale University (New Haven, CT, USA), los datos fueron cedidos por Gary Alt. Minitab, Inc. La descripcion de los datos fue dada por él.

References

Algunas referencias generales estan en el Reader's Digest de Abril, 1979, y Sports Afield de Septiembre, 1981.

Examples

```
data(bears2)
head(bears2)
table(bears2$sexo)
boxplot(cabezaL~sexo, data=bears2)
```

`bearsdepu` *Age and physical measurement data for wild bears (without missing values)*

Description

Wild bears were anesthetized, and their bodies were measured and weighed. One goal of the study was to make a table (or perhaps a set of tables) for people interested in estimating the weight of a bear based on other measurements.

Usage

```
data(bearsdepu)
```

Format

Individual-level variables, as follows:

id Bear identificator.

age Age in total number of months.

month Month number within a given year.

sex Sex code: 1 =male, 2 = female.

headL Length of head, in cm.

headW Width of head, in cm.

neckG Girth of neck, in cm.

length Body length, in cm.

chestG Girth of chest, in cm.

weight Body weight, in kg.

obs Temporal observation number for bear.

name name given to bear

Source

According to Prof. Timothy Gregoire at Yale University (New Haven, CT, USA), the data set was supplied by Gary Alt.

References

Entertaining references are in Reader's Digest April, 1979, and Sports Afield September, 1981.

Examples

```
data(bearsdepu)
head(bearsdepu)
table(bearsdepu$sex)
boxplot(headL~sex, data=bearsdepu)
```

`bearsdepu2` *Edad y características biométricas de osos salvajes (sin datos faltantes)*

Description

Los osos salvajes fueron anestesiados y sus cuerpos medidos. Uno de los objetivos del estudio fue hacer una tabla (o quizas un conjunto de tablas) para las personas interesadas en estimar el peso de un oso basandose en otras medidas. Esta dataframe es igual que "bears" pero sin valores perdidos.

Usage

```
data(bearsdepu2)
```

Format

Contiene variables de nivel individual, como se describen a continuacion:

id Identificador del oso.

edad edad en meses.

mes Diámetro a la altura del pecho, en cm.

sexo 1 = hombre, 2 = mujer.

cabezaL longitud de la cabeza, en cm.

cabezaA ancho de la cabeza, en cm.

cuelloP circunferencia del cuello, en cm.

largo longitud del cuerpo, en cm.

pechoG circunferencia del pecho, en cm.

peso peso corporal, en kg.

obs número de observación temporal para el oso.

nombre nombre dado al oso.

Source

Segun el Prof. Timothy Gregoire de Yale University (New Haven, CT, USA), los datos fueron cedidos por Gary Alt. Minitab, Inc. La descripcion de los datos fue dada por él.

References

Algunas referencias generales estan en el Reader's Digest de Abril, 1979, y Sports Afield de Septiembre, 1981.

Examples

```
data(bearsdepu2)
head(bearsdepu2)
table(bearsdepu2$sexo)
boxplot(cabezaL~sexo, data=bearsdepu2)
```

`beetles` *Population density growth of beetles*

Description

Temporal measurements of density of beetles (Tribolium confusum) growing in different controlled environments.

Usage

```
beetles
```

Format

days Number of days.

diet The quantities of flour (in grams) of the environments where the beetles were growing. Six levels of the factor Diet.

type The various stage of beetles, i.e., eggs, larvae, pupae, and adults.

density The number of insects per environment.

Source

Data from Table No. 1, page 116, of Chapman (1928). Series of experiments under controlled conditions in which flour beetles (Tribolium confusum) are kept in environments of known size. The period from egg to adult is approximately forty days at 27C degrees. The data were entered by Miss Yamara Arancibia, a former student of Prof. Christian Salas-Eljatib.

References

- Chapman RN. 1928. The quantitative analysis of environmental factors. Ecology 9(2):111-122. doi: 10.2307/1929348

Examples

```
data(beetles)
table(beetles$type)
name.diet<-unique(beetles$diet)
num.diet<-length(name.diet)
##Time series plot
#first, some computation
alys<-with(beetles,tapply(density,list(as.factor(days),as.factor(diet)),sum))
```

```
out<-as.data.frame(alys)
out$time<-row.names(out)
head(out)
#Figure 1 of the paper
matplot(out[,"time"], out[,1:num.diet], las=1, type=c("b"),pch=1,
        xlab="Time in days",ylab="Total individuals")
legend("topleft", legend = name.diet, title = "Diet (gr)",
       col = 1:6, lty = 1:6, pch = 1)
```

`beetles2` *Crecimiento poblacional de escarabajos*

Description

Mediciones temporales de densidad de escarabajos (*Tribolium confusum*) creciendo en diferentes ambientes controlados.

Usage

```
beetles2
```

Format

dias Número de dias.

dieta La cantidad de harina (en gramos) de ambientes donde crecen los escarabajos. Seis niveles del factor Dieta.

tipo Estados de desarrollo de los escarabajos, i.e., huevos, larvas, pupas, y adultos.

densidad Número total de individuos por ambiente de crecimiento.

Source

Datos del Cuadro No. 1, page 116, de Chapman (1928). Serie de experimentos bajo condiciones controladas donde escarabajos (Tribolium confusum) se mantienen en ambientes de tamaño conocido. El periodo desde huevo a adulto es de aproximadamente de cuarenta dias a 27 grados Celsius. Los datos fueron digitados por la Srta. Yamara Arancibia, una estudiante del Prof. Christian Salas-Eljatib.

References

- Chapman RN. 1928. The quantitative analysis of environmental factors. Ecology 9(2):111-122. doi: 10.2307/1929348

Examples

```
data(beetles2)
table(beetles2$tipo)
nom.dieta<-unique(beetles2$dieta)
num.dieta<-length(nom.dieta)
##Grafico de serie de tiempo
#primero algunos calculos
alys<-with(beetles2,tapply(
          densidad,list(as.factor(dias),as.factor(dieta)),sum)
          )
out<-as.data.frame(alys)
out$tiempo<-row.names(out)
head(out)
##Figura 1 del paper
matplot(out[,"tiempo"], out[,1:num.dieta], las=1, type=c("b"),pch=1,
        xlab="Tiempo en dias",ylab="Densidad de individuos")
legend("topleft", legend = nom.dieta, title = "Dieta (gr)",
       col = 1:6, lty = 1:6, pch = 1)
```

`biomass` *Contains tree-level biomass data for several species in Canada.*

Description

These are tree-level variables for several species in Canada.

Usage

```
biomass
```

Format

treenum tree number.

spp species common name.

dbh diameter at breast height, in cm.

height total height, in m.

totbiom total biomass, in kg.

bolebiom stem biomass, in kg.

branchbiom branches biomass, in kg.

foliagebiom foliage biomass, in kg.

Source

El archivo de datos fue preparado, y referido, por el Prof. Timothy Gregoire de Yale University (New Haven, CT, USA), mientras Christian Salas (el autor del presente paquete fue su Teaching Assistant).

Examples

```
data(biomass)
head(biomass)
tapply(biomass$totbiom,biomass$spp,summary)
```

`biomass2` *Biomasa a nivel de árbol para especies arboreas de Canada.*

Description

These are tree-level variables for several species in Canada.

Usage

```
biomass2
```

Format

arbol Número del árbol.

spp Nombre común de la especie.

dap Diámetro a la altura del pecho (1.3 m), en cm.

atot Altura total, en m.

wtot Biomasa total, en kg.

wfus Biomasa del fuste, en kg.

wramas Biomasa de las ramas, en kg.

whojas Biomasa del follaje, en kg.

Source

The data are provided courtesy of Prof. Timothy Gregoire at the School of Forestry and Environmental Studies at Yale University (New Haven, CT, USA).

Examples

```
data(biomass2)
head(biomass2)
tapply(biomass2$wtot,biomass2$spp,summary)
```

`cameratrap` *Camera trap data on mammals in Ruaha National Park, southern Tanzania.*

Description

Dataset contains 14604 observations and sampling was carried out for two months during the dry season of 2013 and two months during the wet season of 2014. Each camera station is associated with a randomly placed camera and a trail-based camer, with the aim of comparing communities resulting from the two camera trap placement strategies.

Usage

```
data(cameratrap)
```

Format

Contains 6 variables, as follows:

reference Number of observation od datasets.

placement Type of "placement" placed in each station (random or trail).

season Season where were made the samplings.

station Station where were collected the data.

specie Name of specie medium to large terrestrial mammals.

date.time The date and time of each photographic event is also given.

Source

The data were provided by Dr Jeremy Cusack.

References

- Cusack J, Dickman A, Rowcliffe M, Carbone C, Macdonald D, Coulson T. 2016. Random versus game trail-based camera trap placement strategy for monitoring terrestrial mammal communities. PLoS ONE 10(5): e0126373.

Examples

```
data(cameratrap)
head(cameratrap)
```

cameratrap2 *Camaras trampa de mamiferos en el parque nacional Ruaha, en el sur de Tanzania*

Description

Contains information of Camera trap data on medium to large terrestrial mammals collected at 54 camera stations in Ruaha National Park, southern Tanzania. Dataset contains 14604 observations and sampling was carried out for two months during the dry season of 2013 and two months during the wet season of 2014. Each camera station is associated with a randomly placed camera and a trail-based camer, with the aim of comparing communities resulting from the two camera trap placement strategies.

Usage

```
data(cameratrap2)
```

Format

Contiene 6 variables, como sigue:

referencia Number of observation od datasets.

posicion Type of "placement" placed in each station (random or trail).

temporada Season where were made the samplings.

estacion Station where were collected the data.

especie Name of specie medium to large terrestrial mammals.

fecha.hora The date and time of each photographic event is also given.

Source

Los datos fueron cedidos por el Dr Jeremy Cusack.

References

- Cusack J, Dickman A, Rowcliffe M, Carbone C, Macdonald D, Coulson T. 2016. Random versus game trail-based camera trap placement strategy for monitoring terrestrial mammal communities. PLoS ONE 10(5): e0126373.

Examples

```
data(cameratrap2)
head(cameratrap2)
```

carbohtrees *Carbohydrates concentrations of tree species.*

Description

Dataset contains 863 observations, about of total soluble carbohydrate, starch, and non structural carbohydrates concentrations per mass unit and per volume unit, in three tissues in early summer and early autumn 6-8 adult trees of different species at three elevations of altitudinal gradients sampled in four locations of Chile and Spain.

Usage

```
data(carbohtrees)
```

Format

Contains 16 variables, as follows:

climate Climate of each location, mediterranean and temperate.

site Name of Location of study (termas:Termas de Chillan, antillanca:Antillanca area within Puyehue National Park, castillo:Cerro Castillo Natural Reserve, farellones:Farellones in Central Chile, pyrenees: Sierra de Cutas area in Spanish Central Pyrenees, sierra:Sierra Nevada).

species name species of study (lenga: Nothofagus pumilio, frangel: Kageneckia angustifolia, uncinata: Pinus uncinata, sylvestris: Pinus sylvestris).

tissue Type of tissue, new developing twings, stem sapwood and branches.

time Meauserement season (spring or autumn).

elevation Type of elevation. "Treeline", intermediate named as "mid", and closed or montane forest named as "low".

tree Id for tree.

tree.site Id site for each location of study.

tss Value of concentrations soluble carbohydrate per mass unit.

st Value of concentrations starch per mass unit.

nsc Value of concentrations non structural carbohydrates per mass unit.

tss.nsc .

wd It might be 'wood density', but not sure.

tss.mv Value of concentrations soluble carbohydrate per volume unit.

st.mv Value of concentrations starch per volume unit.

nsc.mv Value of concentrations non structural carbohydrates per volume unit.

Source

The data were obtained from the DRYAD repository at doi: 10.5061/dryad.ks97h.

References

Piper F, Vinegla B, Linares J, Camarero J, Cavieres L, Fajardo A. 2016. Mediterranean and temperate treelines are controlled by different environmental drivers. Journal of Ecology 104: 691-702. doi: 10.1111/13652745.12555

Examples

```
data(carbohtrees)
head(carbohtrees)
```

`carbohtrees2` *Concentración de carbohidratos de especies arbóreas*

Description

Los datos contienen 863 observaciones, sobre carbohidratos totales solubles, almidon, y carbohidratos no-estructurales por unidad de masa y por unidad de volumen, en tres tejidos obtenidos al comienzo del verano y al comienzo del otoño. Lo anterior fue medido entre 6-8 árboles adultos de diferentes especies en un gradiente altitudinal, muestreados en cuatro sitios en Chile y España.

Usage

```
data(carbohtrees2)
```

Format

Hay 16 variables disponibles:

clima Tipo de clima de cada sitio: mediterraneo o temperado.

sitio Nombre del sitio de estudio, como sigue: "termas" (Termas de Chillán), "antillanca" (sector Antillanca dentro del Parque Nacional), "castillo" (Reserva Nacional Cerro Castillo), "farellones" (Farellones, a 20 Kms de Santiago, en Chile), "pyrenees" (Sierra de Cutas area in Spanish Central Pyrenees), "sierra" (Sierra Nevada).

especie name species of study (lenga: Nothofagus pumilio, frangel: Kageneckia angustifolia, uncinata: Pinus uncinata, sylvestris: Pinus sylvestris).

tejido Type of tissue, new developing twings, stem sapwood and branches.

temporada Meauserement season (spring or autumn).

altitud Type of elevation. "Treeline", intermediate named as "mid", and closed or montane forest named as "low".

arbol Id for tree.

arb.sitio Id site for each location of study.

cts Concentración de carbohidratos solubles totales por unidad de masa.

almidon Concentración de almidon por unidad de masa.

cne Concentración de carbohidratos no-estructurales por unidad de masa.

cts.cne División entre cts y cne.

dmade It might be 'wood density', but not sure.

tss.mv Value of concentrations soluble carbohydrate per volume unit.

st.mv Value of concentrations starch per volume unit.

nsc.mv Value of concentrations non structural carbohydrates per volume unit.

Source

Los datos fueron obtenidos desde el repositorio DRYAD en doi: 10.5061/dryad.ks97h.

References

Piper F, Vinegla B, Linares J, Camarero J, Cavieres L, Fajardo A. 2016. Mediterranean and temperate treelines are controlled by different environmental drivers. Journal of Ecology 104:691-702. doi: 10.1111/13652745.12555

Examples

```
data(carbohtrees2)
head(carbohtrees2)
```

---

casen *Datos encuesta CASEN del 2022*

Description

Encuesta de Caracterización Socioeconómica Nacional (CASEN) de Chile, es realizada por el Ministerio de Desarrollo Social y Familia con el objetivo de disponer de información que permita conocer situación de los hogares y de la población. Estos datos corresponden a los de la encuesta CASEN 2022.

Usage

```
data(casen)
```

Format

Este set de datos contiene las siguientes columnas:

id.vivienda Identificador de la vivienda.

id.persona Identificador de la persona.

region Región administrativa de Chile.

comuna Comuna.

edad Edad de la persona, en años.

sexo Sexo de la persona.

esc Años de escolaridad (edad >= 15).

educ Clasificación de educación recibida.

personas.hogar Número de personas que habitan en el hogar.

tipohogar Nivel de tipo de hogar según encuesta.

activ Nivel de actividad actual de la persona según encuesta.

ytot Ingreso total.

ytoth Ingreso total del hogar.

ypch Ingreso total per cápita del hogar.

ytotcor Ingreso total corregido.

ytotcorh Ingreso total corregido del hogar.

ypc Ingreso total corregido per cápita del hogar.

mayor.nivel.edu ¿Cuál es el nivel educacional al que asiste o el más alto al cual asistió?

area.edu.cinef Clasificación Internacional Normalizada de Educación (CINE-F).

subarea.edu.cinef Clasificación Internacional Normalizada de Sub-Area de Educación (CINE-F).

previ.salud Sistema de previsión de salud.

Source

Los datos fueron obtenidos desde el web https://observatorio.ministeriodesarrollosocial.gob.cl/encuesta-casen. Note que solo algunas columnas son utilizadas aca, así como el nombre de algunas columnas fueron levemente cambiados.

Examples

```
data(casen)
head(casen)
table(casen$region)
table(casen$region,casen$sexo)
tapply(casen$ytotcor,casen$sexo,sum)
```

---

cdf *Function to compute the cumulative distribution of a variable*

Description

Builds the cumulative distribution of a vector, using a step% of the data as fixed-intervals.

Usage

```
cdf(y = y, step = 0.05)
```

Arguments

y	a vector of a random variable
step	a numeric proportion of the data used as increment interval for building the cdf of the random variable. The default value for 'step' is 0.05, representing a 5%.

Details

By default the cumulative distribution is build using 5% of the data as intervals, that is to say, from 0.05 (i.e., 5%) to 0.95 (i.e., 95%).

Value

returns a dataframe having two columns: the first contains the random variable values and the second the cumulative distribution for the variable.

Author(s)

Christian Salas-Eljatib

References

Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
y.var <- rnorm(10)
cdf(y.var)
cdf(y.var, step=0.1)
```

---

chicksw *Chicken growth data.*

Description

The body weights of the chicks were measured at birth and every second day thereafter until day 20. They were also measured on day 21. There were four groups on chicks on different protein diets.

Usage

```
data(chicksw)
```

Format

Contains four variables, as follows:

chick An ordered factor with levels different giving a unique identifier for the chick. The ordering of the levels groups chicks on the same diet together and orders them according to their final weight (lightest to heaviest) within diet.

diet A factor with levels 1,2,3 and 4 indicating which experimental diet the chick received.

time A numeric vector giving the number of days since birth when the measurement was made.

weight A numeric vector giving the body weight of the chick (gm).

Source

The data were obtained from the $alr4$ library.

References

Crowder M, Hand D. 1990. Analysis of Repeated Measures. Chapman and Hall

Examples

```
data(chicksw)
head(chicksw)
```

`chicksw2` *Crecimiento de pollos.*

Description

El peso de pollos fueron medidos al momento de nacer y cada dia por medio hasta el dia 20. Ellos también fueron medidos el día 21. Hubo cuatro grupos de pollos en diferentes dietas de proteinas.

Usage

```
data(chicksw2)
```

Format

Contine cuatro variables, como sigue:

pollo Un identificador único para cada pollo. La numeracion esta ordenado segun el peso final dentro de cada dieta.

dieta Un factor con cuatro nivels: 1,2,3 y 4 indicando que dieta recibió el pollo.

tiempo Número de días desde el nacimiento.

peso Peso del pollo (gm).

Source

Los datos fueron obtenidos desde la librería $alr4$.

References

Crowder M, Hand D. 1990. Analysis of Repeated Measures. Chapman and Hall

Examples

```
data(chicksw2)
head(chicksw2)
```

`ChickWeight` *Chicken growth data – kept it only for the book.*

Description

These data are the same as in the 'chicksw' dataframe, which is the one that should be preferred. Nonetheless, I kept the name of this dataframe (i.e., ChickWeight) to be able for using in the book of Salas-Eljatib (2021). Further details of the dataframe can be found by typing "?chicksw"

Usage

```
data(ChickWeight)
```

Format

Contains four variables, as follows:

weight A numeric vector giving the body weight of the chick (gm).

Time A numeric vector giving the number of days since birth when the measurement was made.

Chick An ordered factor with levels different giving a unique identifier for the chick. The ordering of the levels groups chicks on the same diet together and orders them according to their final weight (lightest to heaviest) within diet.

Diet A factor with levels 1,2,3 and 4 indicating which experimental diet the chick received.

Source

See related-details on this, for the dataframe "chicksw".

References

- Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
data(ChickWeight)
head(ChickWeight)
```

co2temp *CO2 emissions and temperature at country-level.*

Description

Data obtained from the *hockeystick* package, which retrieves annual global carbon dioxide emissions since 1750 from the World Data repository https://github.com/owid/co2-data, as well as other climate-related variables.

Usage

```
data(co2temp)
```

Format

The data contains 75 variables, and the fully description can be reviewed in the references provided here.

country Country.

year Calendar year.

iso_code TBA.

population Population size, in number of people.

gdp Gross domestic product, a measure of the value added created through the production of goods and services in a country.

cement_co2 TBA.

cement_co2_per_capita TBA.

co2 TBA.

co2_growth_abs TBA.

co2_growth_prct TBA.

co2_including_luc TBA.

co2_including_luc_growth_abs TBA.

co2_including_luc_growth_prct TBA.

co2_including_luc_per_capita TBA.

co2_including_luc_per_gdp TBA.

co2_including_luc_per_unit_energy TBA.

co2_per_capita TBA.

co2_per_gdp TBA.

co2_per_unit_energy TBA.

coal_co2 TBA.

coal_co2_per_capita TBA.

consumption_co2 TBA.

consumption_co2_per_capita TBA.

consumption_co2_per_gdp TBA.

cumulative_cement_co2 TBA.

cumulative_co2 TBA.

cumulative_co2_including_luc TBA.

cumulative_coal_co2 TBA.

cumulative_flaring_co2 TBA.

cumulative_gas_co2 TBA.

cumulative_luc_co2 TBA.

cumulative_oil_co2 TBA.

cumulative_other_co2 TBA.

energy_per_capita TBA.

energy_per_gdp TBA.

flaring_co2 TBA.

flaring_co2_per_capita TBA.

gas_co2 TBA.

gas_co2_per_capita TBA.

ghg_excluding_lucf_per_capita TBA.

ghg_per_capita TBA.

land_use_change_co2 TBA.

land_use_change_co2_per_capita TBA.

methane TBA.

methane_per_capita TBA.

nitrous_oxide TBA.

nitrous_oxide_per_capita TBA.

oil_co2 TBA.

oil_co2_per_capita TBA.

primary_energy_consumption TBA.

share_global_cement_co2 TBA.

share_global_co2 TBA.

share_global_co2_including_luc TBA.

share_global_coal_co2 TBA.

share_global_cumulative_cement_co2 TBA.

share_global_cumulative_co2 TBA.

share_global_cumulative_co2_including_luc TBA.

share_global_cumulative_coal_co2 TBA.

share_global_cumulative_flaring_co2 TBA.

share_global_cumulative_gas_co2 TBA.

share_global_cumulative_luc_co2 TBA.

share_global_cumulative_oil_co2 TBA.

share_global_cumulative_other_co2 TBA.

share_global_flaring_co2 TBA.

share_global_gas_co2 TBA.

share_global_luc_co2 TBA.

share_global_oil_co2 TBA.

share_global_other_co2 TBA.

share_of_temperature_change_from_ghg TBA.

temperature_change_from_ch4 TBA.

temperature_change_from_co2 TBA.

temperature_change_from_ghg TBA.

temperature_change_from_n2o TBA.

total_ghg TBA.

total_ghg_excluding_lucf TBA.

trade_co2 TBA.

trade_co2_share TBA.

Source

The data were obtained from the *hockeystick* library of R. Notice that in the dataframe only a portion of countries have been kept.

References

- https://www.globalcarbonproject.org/carbonbudget/

- Friedlingstein P. et al. 2020. Global Carbon Budget 2020, Earth System Science Data 12:3269-3340 doi: 10.5194/essd1232692020

Examples

```
data(co2temp)
names(co2temp)
table(co2temp$country)
lattice::xyplot(co2~year|country,data=co2temp,type="l",as.table=TRUE)
```

`contrast` *Function to compute the needed statistics for a given contrast*

Description

The function computes the statistics for inference in a given contrast, subject to a given significance level. Those statistics are as follows: estimated contrast, standard error of the contrast, and the confidence interval of the contrast.

Usage

```
contrast(
  model = model,
  coef.cont = coef.cont,
  grp.m = grp.m,
  grp.n = grp.n,
  alpha = 0.05,
  full = TRUE
)
```

Arguments

`model`	object containing the fitted model
`coef.cont`	vector with the coefficients to establish the contrasts
`grp.m`	a vector having the sample mean per each group, or level of the factor under study.
`grp.n`	a vector having the sample size per each group, or level of the factor under study.
`alpha`	is the significance level for building the confidence intervals. Default value is 0.05, which is 95% confidence level.
`full`	FALSE if want short output, TRUE for longer (i.e. more details). Default is TRUE.

Details

The contrast is established based upon an already fitted statistical model that describe the relationship among variables. The significance level ('alpha') is defined by the user, although by default has been set to 0.05, that is to say, a 95% of statistical confidence.

Value

This function returns the above described statistics for a given contrast.

Author(s)

Christian Salas-Eljatib

References

- Salas-Eljatib C. 2025. datana: Datasets and Functions to Accompany Análisis de Datos con R. R package version 1.0.7, doi: 10.32614/CRAN.package.datana, https://CRAN.R-project.org/package=datana

Examples

```
data(fertiliza)
table(fertiliza$treat)
means.trt <- tapply(fertiliza$volume,fertiliza$treat,mean);means.trt
sds.trt <- tapply(fertiliza$volume,fertiliza$treat,sd);sds.trt
ns.trt <- tapply(fertiliza$volume,fertiliza$treat,length);ns.trt
m1 <- lm(volume ~ treat, data=fertiliza)
anova(m1)
## Coefficients to be used in the contrast
#c1: (tmoA1-A2) - (tmoA3-A4)
C1.coeff <- c(0,1,1,-1,-1)
contrast(model=m1,C1.coeff,grp.m=means.trt,grp.n=ns.trt,alpha=0.1,full=TRUE)
contrast(model=m1,C1.coeff,grp.m=means.trt,grp.n=ns.trt,alpha=0.1,full=FALSE)
contrast(m1,C1.coeff,grp.m=means.trt,grp.n=ns.trt,alpha=0.05,full=TRUE)
contrast(m1,C1.coeff,grp.m=means.trt,grp.n=ns.trt)
```

---

corkoak *Tree-level cork biomass data for Oak trees in Portugal*

Description

Measurements of cork weight in *Quercus suber* (Oak) trees in Portugal.

Usage

```
corkoak
```

Format

tree A correlative number for each sample tree.

csc is tree circumference at 1.3 m outside bark, in cm.

cbc is tree circumference at 1.3 m under bark, in cm.

bt bark thickness, in cm.

hdeb is debarking height, in m.

hblc height to base of live crown, in m.

nb number of branches debarked

cr.diam crown diameter, in m.

w total green weight of the stripped cork, in kg

stratum Stratum

Source

Data supplied electronically to Prof. Timothy Gregoire (Yale University) by authors accompanied by a note which said "After the article was published we discovered a problem with 2 of the observations so Teresa and I decided it was best just to delete them."

References

- Fonseca TJ, Parresol BR. 2001. A new model for cork weight estimation in northern Portugal with methodology for construction of confidence intervals. Forest Ecology and Management 152(1):131–139.

Examples

```
data(corkoak)
head(corkoak)
```

---

corkoak2 *Datos de biomasa de corcho en árboles de Encino en Portugal*

Description

Mediciones de peso de corcho en árboles muestra de Quercus suber en Portugal.

Usage

```
corkoak2
```

Format

arbol A correlative number for each sample tree.

perimetro.cc is tree circumference at 1.3 m outside bark, in cm.

perimetro.sc is tree circumference at 1.3 m under bark, in cm.

e.corteza bark thickness, in cm.

h.desc is debarking height, in m.

hcc height to base of live crown, in m.

num.ram number of branches debarked

diam.copa crown diameter, in m.

biomasa total green weight of the stripped cork, in kg

estrato Estrato

Source

Datos cedidos por Prof. Timothy Gregoire (Yale University) y los autores originales mencionaron "After the article was published we discovered a problem with 2 of the observations so Teresa and I decided it was best just to delete them."

References

- Fonseca TJ, Parresol BR. 2001. A new model for cork weight estimation in northern Portugal with methodology for construction of confidence intervals. Forest Ecology and Management 152(1):131–139.

Examples

```
data(corkoak2)
head(corkoak2)
```

`crown` *Tree crown radii*

Description

Crown radii measurements in cardinal directions for sample trees at the Rucamanque experimental forest, near Temuco, Chile. Data were collected within a sample plot of 250 m^2, located in a secondary forest stand dominated by Nothofagus obliqua.

Usage

```
data(crown)
```

Format

Contains of variables, as follows:

spp Species code. 'Ro' is Nothofagus obliqua (roble), 'Co' is Nothofagus dombeyi (Coigue) and 'Ol' is Olivillo.

dbh Diameter at breast height, in cm.

toth Total height, in m.

crad.n Crown radii towards the north, in m.

crad.e Crown radii towards the east, in m.

crad.s Crown radii towards the south, in m.

crad.w Crown radii towards the west, in m.

x.coord Cardinal position at the X-axis, in m.

y.coord Cardinal position at the Y-axis, in m.

cr.diam Crown diameter, in m.

Source

Data were provided by Dr Christian Salas-Eljatib, Universidad de Chile (Santiago, Chile).

References

- Salas C. 2001. Caracterización básica del relicto de Biodiversidad Rucamanque [Basic characterization of the biodiversity remnant Rucamanque]. Bosque Nativo, 29:3-9. https://eljatib.com/publication/2001-06-01_caracterizacion_basi/

- Salas C, and Garcia O. 2006. Modelling height development of mature Nothofagus obliqua. Forest Ecology and Management 229 (1-3): 1-6. doi: 10.1016/j.foreco.2006.04.015

Examples

```
data(crown)
table(crown$spp)
descstat(crown[,c("dbh","cr.diam")])
```

`crown2` *Radios de copa de árboles*

Description

Mediciones de radios de copa en direcciones cardinales para árboles muestra en Rucamanque, cerca de Temuco, Chile. Los datos fueron colectados al interior de una parcela de muestreo de 250 m^2, establecidad en un bosque secundario dominado por Nothofagus obliqua.

Usage

```
data(crown2)
```

Format

Contiene las siguientes columnas:

espe Código de especie, donde: 'Ro' es Nothofagus obliqua (Roble), 'Co' es Nothofagus dombeyi (Coigue) y 'Ol' es Olivillo.

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m.

rc.n Radio de copa hacia el Norte, en m.

rc.e Radio de copa hacia el Este, en m.

rc.s Radio de copa hacia el Sur, en m.

rc.w Radio de copa hacia el Oeste, en m.

coord.x Posición cartesiana en el eje-X, en m.

coord.y Posición cartesiana en el eje-Y, en m.

dcopa Diámetro de copa, en m.

Source

Datos cedidos por el Prof. Christian Salas-Eljatib, Universidad de Chile (Santiago, Chile).

References

- Salas C. 2001. Caracterización básica del relicto de Biodiversidad Rucamanque [Basic characterization of the biodiversity remnant Rucamanque]. Bosque Nativo, 29:3-9. https://eljatib.com/publication/2001-06-01_caracterizacion_basi/

- Salas C, and Garcia O. 2006. Modelling height development of mature Nothofagus obliqua. Forest Ecology and Management 229 (1-3):1-6. doi: 10.1016/j.foreco.2006.04.015

Examples

```
data(crown2)
table(crown2$espe)
descstat(crown2[,c("dap","dcopa")])
```

`deleteRight` *Deletes the last n-characters of a string*

Description

Function to delete the last n-characters of a string from the right-hand side.

Usage

```
deleteRight(fac, n)
```

Arguments

`fac`	is an object of class string or factor
`n`	is the number of characters to be deleted of a the string given in 'fac'.

Details

It is specially set to arrange data vector having alphanumeric format.

Value

This function returns an object having n-less characters from the right-hand side.

Author(s)

Christian Salas-Eljatib

References

Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
last.names.id <- c("Stage-1924","Gregoire-1958","Robinson-1967")
deleteRight(last.names.id,5)
deleteRight(last.names.id,4)
```

---

demograph *Contains information of demography of species.*

Description

Dataset contains 61 observations about life histories values for each species and site, as obtained from the parameterization carried out in studies that used the model SORTIE

Usage

```
data(demograph)
```

Format

Contains 15 variables, as follows:

sp Name specie.

site Name of site of study.

country Name of country.

site.n Code of site.

code Code of specie.

genus Genus of specie.

sps Abbreviated name specie.

family Family of specie.

phyl Type of phylogeny.

l.hab Type of leaf habit.

l.type .

leaf Type of leaf.

growth.l Growth at full light (time in years).

growth.d Growth in shade.

surv.d Survival in shade.

Source

The data were obtained from the DRYAD repository.

References

- Ameztegui A, Paquette A, Shipley B, Heym M, Messier C, Gravel D. 2016. Shade tolerance and the functional trait: demography relationship in temperate and boreal forests. Functional Ecology 31: 821-830.

Examples

```
data(demograph)
head(demograph)
```

---

descstat *Creates a descriptive statistics table for continuous variables*

Description

Function to create a descriptive statistics table for continuous variables from a dataframe.

Usage

```
descstat(data = data, decnum = 4, full = FALSE)
```

Arguments

data	a dataframe containing numeric variables as columns.
decnum	the number of decimals to be used in the output.
full	TRUE for a longer output (i.e. more descriptive statistics). The default is to FALSE.

Details

The resulting table offers the main central and dispersion statistics.

Value

This function wraps descriptive statistics into a summarize table having the following descriptive statistics: sample size, minimum, maximum, mean, median, SD, and coefficient of variation. If the full option is set to TRUE, the following statistics are added to the table: 25th and 75th percentiles, the interquartile range, skewness, and kurtosis.

Author(s)

Christian Salas-Eljatib and Tomas Cayul.

References

Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
#creating a fictitious dataframe
set.seed(1234)
df <- as.data.frame(cbind(variable1=rnorm(5, 0), variable2=rnorm(5, 2)))
## adding one missing value
df[3,1] <- NA
df
#' #using the function
descstat(data=df)
descstat(data=df,decnum=1)
descstat(df,2)
```

`election` *Presidential election data of Florida (USA) in 2000.*

Description

County-by-county vote for president in Florida in 2000 for Bush, Gore and Buchanan.

Usage

```
data(election)
```

Format

Contains three variables, as follows:

gore Vote for Gore.

bush Vote for Bush.

buchanan Vote for Pat Buchanan.

Source

The data were obtained from the $alr4$ library.

References

Weisberg S. 2014. Applied Linear Regression. 4th edition. Hoboken NJ: Wiley

Examples

```
data(election)
head(election)
```

election2 *Elección presidencial en el estado de Florida (USA) en el 2000.*

Description

Conteo de votos a nivel de condado en el estado de Florida, año 2000.

Usage

```
data(election2)
```

Format

Contiene las siguientes tres columnas:

gore Votos para Gore. Número de votos para Al Gore.

bush Votos para Bush. Número de votos para George W. Bush.

buchanan Votos para Buchaman. Número de votos para Pat Buchanan.

Source

Los datos se obtuvieron desde el paquete $alr4$ de R.

References

Weisberg S. 2014. Applied Linear Regression. 4th edition. Hoboken NJ: Wiley

Examples

```
data(election2)
head(election2)
```

eucaleaf *Leaf measurements for Eucalyptus nitens trees in Tasmania, Australia.*

Description

The length, width, and area of Eucalyptus nitens leaves were measured.

Usage

```
data(eucaleaf)
```

Format

Contains leaf-level variables, as follows:

time Time factor, in two levels: early or Late.

tree Sample tree code identificator.

shoot Shoot description factor, in three levels.

l Length of the leaf, in mm.

w Width of the leaf, in mm.

la leaf area, in cm^2.

Source

Although the original source of the measurements is the Dissertation of Dr Candy (1999), the data file used here was courtesy of Prof. Timothy Gregoire at Yale University (New Haven, CT, USA). Furthermore, these data were used by Gregoire and Salas (2009).

References

- Candy SG. 1999. Predictive models for integrated pest management of the leaf beetle *Chrysophtharta bimaculata* in *Eucalyptus nitens* in Tasmania. Doctoral dissertation, University of Tasmania, Hobart, Australia.

- Gregoire TG, and Salas C. 2009. Ratio estimation with measurement error in the auxiliary variate. Biometrics 65(2):590-598 doi: 10.1111/j.15410420.2008.01110.x

Examples

```
data(eucaleaf)
head(eucaleaf)
```

`eucaleaf2` *Mediciones foliares para árboles de Eucalyptus nitens en Tasmania, Australia.*

Description

Mediciones de largo, ancho y area de hojas de Eucalyptus nitens.

Usage

```
data(eucaleaf2)
```

Format

Contiene variables a nivel de hoja, como sigue:

tiempo Factor a dos niveles: Temprano o Tardío.

arbol Identificador del árbol muestra.

meristema Factor de la descripción del meristema, en tres niveles.

largo Largo de la hoja, en mm.

ancho Ancho de la hoja, en mm.

area Área foliar, en cm^2.

Source

Aunque la fuente original de estas mediciones proviene de la tesis del Dr. Candy (1999), el archivo de datos fue cortesía del Prof. Timothy Gregoire de Yale University (New Haven, CT, USA). Además, estos datos fueron ocupados en el estudio de Gregoire y Salas (2009).

References

- Candy SG. 1999. Predictive models for integrated pest management of the leaf beetle Chrysophtharta bimaculata in Eucalyptus nitens in Tasmania. Doctoral dissertation, University of Tasmania, Hobart, Australia.

- Gregoire TG, and Salas C. 2009. Ratio estimation with measurement error in the auxiliary variate. Biometrics 65(2):590-598 doi: 10.1111/j.15410420.2008.01110.x

Examples

```
data(eucaleaf2)
head(eucaleaf2)
```

`eucaleafAll` *Leaf measurements (all, n=744) for Eucalyptus nitens trees in Tasmania, Australia.*

Description

The length, width, and area of Eucalyptus nitens leaves were measured for all the samples of Candy (1999).

Usage

```
data(eucaleafAll)
```

Format

Contains leaf-level variables, as follows:

time Time factor, in two levels: early or Late.

tree Sample tree code identificator.

shoot Shoot description factor, in three levels.

l Length of the leaf, in mm.

w Width of the leaf, in mm.

la leaf area, in cm^2.

Source

Although the original source of the measurements is the Dissertation of Dr Candy (1999), the data file used here was courtesy of Prof. Timothy Gregoire at Yale University (New Haven, CT, USA). Furthermore, these data were used by Gregoire and Salas (2009).

References

- Candy SG. 1999. Predictive models for integrated pest management of the leaf beetle Chrysophtharta bimaculata in Eucalyptus nitens in Tasmania. Doctoral dissertation, University of Tasmania, Hobart, Australia.

Examples

```
data(eucaleafAll)
head(eucaleafAll)
```

`eucaleafAll2` *Mediciones foliares (todas, n=744) para árboles de Eucalyptus nitens en Tasmania, Australia.*

Description

Mediciones de largo, ancho y área de hojas de Eucalyptus nitens para toda la muestra de Candy (1999).

Usage

```
data(eucaleafAll2)
```

Format

Contiene variables a nivel de hoja, como sigue:

tiempo Factor a dos niveles: Temprano o Tardío

arbol Identificador del árbol muestra

meristema Factor de la descripción del meristema, en tres niveles.

largo Largo de la hoja, en mm

ancho Ancho de la hoja, en mm

area Área foliar, en cm^2

Source

Aunque la fuente original de estas mediciones proviene de la tesis del Dr. Candy (1999), el archivo de datos fue cortesía del Prof. Timothy Gregoire de Yale University (New Haven, CT, USA).

References

- Candy SG. 1999. Predictive models for integrated pest management of the leaf beetle Chrysophtharta bimaculata in Eucalyptus nitens in Tasmania. Doctoral dissertation, University of Tasmania, Hobart, Australia.

Examples

```
data(eucaleafAll2)
head(eucaleafAll2)
```

---

eucaplot

*Tree-level data from a sample plot established in a *Eucalyptus globulus* plantation.*

Description

Tree-level variables collected for all trees (even the variable height) within a sample plot in a forestry plantation of *Eucalyptus globulus* near Gorbea, southern Chile. The plot size is 500 m^2. The plantation is 15 yr-old and had been subject to three thinnings.

Usage

```
data(eucaplot)
```

Format

The dataframe contains four variables as follows:

dbh Diameter at breast height, in cm.

health health status (1: good, 2: medium, 3: bad).

shape stem shape for timber purposes (1: good, 2: medium, 3: bad).

crown.class Crown class (1: superior, 2: intermedium, 3: lower).

toth Total height, in m.

Source

The data were provided courtesy of Dr Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

Examples

```
data(eucaplot)
head(eucaplot$health)
descstat(eucaplot[,c("dbh","toth")])
```

`eucaplot2` *Lista de árboles con todas las variables medidas en una parcela de muestreo, establecida en una plantación de *Eucalyptus globulus*.*

Description

Variables a nivel individual medidas en todos los árboles (incluso la variable altura) encontrados en una parcela de muestreo en una plantación forestal de *Eucalyptus globulus* cerca de Gorbea, en el sur de Chile. La superficie de la parcela es de 500 m^2. La plantación tiene 15 años de edad y ha estado sujeta a tres raleos.

Usage

```
data(eucaplot2)
```

Format

Los datos contienen las siguientes cuatro columnas:

dap Diámetro a la altura del pecho, en cm.

sanidad Evaluación cualitativa de la sanidad del árbol (1: buena, 2: media, 3: mala).

forma Evaluación cualtitativa de la forma del fuste (1: buena, 2: media, 3: mala).

clase.copa Clase de copa (1: superior, 2: intermedio, 3: inferior).

atot Altura total, en m.

Source

Los datos fueron cedidos por el Prof. Christian Salas (Universidad de Chile, Santiago, Chile), y colectados por él mientras fue Profesor del Departamento de Ciencias Forestales en la Universidad de La Frontera (Temuco, Chile). La plantación se encontraba dentro de un predio del colega (QEPD) Hugo Castro.

Examples

```
data(eucaplot2)
table(eucaplot2$sanidad)
descstat(eucaplot2[,c("dap","atot")])
```

`eucaplotr` *Tree-list (realistic-) data in a sample plot established in a *Eucalyptus globulus* plantation in southern Chile.*

Description

Tree-level variables collected in a sample plot (area=500 m^2) in a forestry plantation of *Eucalyptus globulus* near Gorbea, in southern Chile. The variable height, was only measured in a sub-sample of trees within the plot. The plantation is 15 yr-old and had been subject to three thinnings.

Usage

```
data(eucaplotr)
```

Format

The dataframe contains four variables as follows:

dbh Diameter at breast height, in cm.

health health status (1: good, 2: medium, 3: bad).

shape stem shape for timber purposes (1: good, 2: medium, 3: bad).

crown.class Crown class (1: superior, 2: intermedium, 3: lower).

toth Total height, in m.

Source

The data were provided courtesy of Dr Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

Examples

```
data(eucaplotr)
head(eucaplotr$health)
descstat(eucaplotr[,c("dbh","toth")])
```

`eucaplotr2` *Lista de árboles con variables medidas (más realista) en una parcela de muestreo, establecida en una plantación de Eucalyptus globulus.*

Description

Variables a nivel individual medidas en los árboles encontrados en una parcela de muestreo (de 500 m^2) en una plantación forestal de *Eucalyptus globulus*, cerca de Gorbea (Sur de Chile). La variable altura fue medida solo en una sub-muestra de árboles. La plantación tiene 15 años de edad y ha estado sujeta a tres raleos.

Usage

```
data(eucaplotr2)
```

Format

Los datos contienen las siguientes cuatro columnas:

dap Diámetro a la altura del pecho, en cm.

sanidad Evaluación cualitativa de la sanidad del árbol (1: buena, 2: media, 3: mala).

forma Evaluación cualtitativa de la forma del fuste (1: buena, 2: media, 3: mala).

clase.copa Clase de copa (1: superior, 2: intermedio, 3: inferior).

atot Altura total, en m. Esta variable fue medida solo en una submuestra de árboles.

Source

Los datos fueron cedidos por el Prof. Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile), y colectados por él mientras fue Profesor del Departamento de Ciencias Forestales en la Universidad de La Frontera (Temuco, Chile). La plantación se encontraba dentro de un predio del colega (QEPD) Hugo Castro.

Examples

```
data(eucaplotr2)
table(eucaplotr2$sanidad)
descstat(eucaplotr2[,c("dap","atot")])
```

fertiliza *Fertilization experiment data.*

Description

Data contains volume data at plot-level for a fertilization experiment.

Usage

```
data(fertiliza)
```

Format

Contains two variables, as follows:

treat Treatment level.

volume Plot-level volume, in m^3.

Source

The data were provided by Dr Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

References

not yet

Examples

```
data(fertiliza)
head(fertiliza)
class(fertiliza$treat)
unique(fertiliza$treat)
means.g <- tapply(fertiliza$volume,fertiliza$treat,mean);means.g
sds.g <- tapply(fertiliza$volume,fertiliza$treat,sd);sds.g
ns.g <- tapply(fertiliza$volume,fertiliza$treat,length);ns.g
```

fertiliza2 *Experimento de fertilización*

Description

Datos a nivel de parcela de un experimento de fertilización con tratamientos y replicas.

Usage

```
data(fertiliza2)
```

Format

Contiene tres columnas como sigue:

tmo Tratamiento.Factor medido en diferentes niveles.

vol Volumen de madera en la parcela experimental, en m^3.

Source

Datos cedidos por el Prof. Christian Salas.

References

not yet

Examples

```
data(fertiliza2)
head(fertiliza2)
class(fertiliza2$tmo)
unique(fertiliza2$tmo)
media.g <- tapply(fertiliza2$vol,fertiliza2$tmo,mean);media.g
desvst.g <- tapply(fertiliza2$vol,fertiliza2$tmo,sd);desvst.g
n.g <- tapply(fertiliza2$vol,fertiliza2$tmo,length);n.g
```

---

ficdiamgr *Diameter growth of trees*

Description

The 'ficdiamgr' is a fictitious dataframe built to show the structure of longitudinal data. The dataframe has records of tree diameter growth of five sample trees, spanning three species.

Usage

```
data(ficdiamgr)
```

Format

A time series data containing the following columns:

tree.id an ordered factor indicating the tree on which the measurement is made. The ordering is according to increasing maximum diameter.

time a numeric vector giving the numbers of days since establishment.

dbh a numeric vector of diameter at breast height, in cm.

site a factor variable, representing site conditions with two levels.

spp a factor variable, representing tree species with three levels.

Source

This dataframe was built from the 'Orange' data of the $datasets$ package, by Christian Salas-Eljatib.

Examples

```
data(ficdiamgr)

coplot(dbh ~ time | tree, data = ficdiamgr, show.given = FALSE)
```

`ficdiamgr2` *Crecimiento diametral de árboles*

Description

Los datos 'ficdiamgr2' son ficticios, y fue construida para mostrar la estructura de datos longitudinales. Los datos tienen registro de crecimiento en cinco árboles muestra, representando a tres especies.

Usage

```
data(ficdiamgr2)
```

Format

Una serie de tiempo conteniendo las siguientes columnas:

arbol indica el identificador del árbol.

tiempo número de dias desde el inicio de las mediciones.

dap diámetro a la altura del pecho, en cm.

sitio un factor, representando condiciones de sitio, en dos niveles.

espe un factor, representando especie del árbol, en tres niveles.

Source

Estos datos fueron modificados desde la dataframe 'Orange' de la librería 'datasets', por Christian Salas-Eljatib.

Examples

```
data(ficdiamgr2)

coplot(dap ~ tiempo | arbol, data = ficdiamgr2, show.given = FALSE)
```

`findColumn.byname` *Finds the position of a specific variable.*

Description

Sometimes in data manipulation we face the task of locating the position of a specific variable within a dataframe. The function finds the position in which a column name is within an object.

Usage

```
findColumn.byname(data = data, col.name = col.name)
```

Arguments

`data`	is a dataframe
`col.name`	is a string specifying the name of the variable

Details

Although the function finds the position of a specific variable, can also be used for more than one variable.

Value

This function returns the number of a specific column-name.

Note

It can be used for a vector of specified column-names as well.

Author(s)

Christian Salas-Eljatib

References

Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
df <- data.frame(varX=1:5, varY=letters[1:5], varZ=rep("a",5),
varK=rep("b",5))
df
#using the function
findColumn.byname(df, c("varY","varZ"))
findColumn.byname(df, "varK")
#Creating an example vector
vector <- letters
```

```
vector
findColumn.byname(vector, c("h","z"))
```

`fishgrowth` *Data on fish growth.*

Description

Data on samples of small mouth bass collected in West Bearskin Lake, Minnesota, in 1991. The file wblake includes only fish of ages 8 or younger.

Usage

```
data(fishgrowth)
```

Format

Contains 3 variables, as follows:

years Year at capture.

length Length at capture (mm).

scale radius of a key scale (mm).

Source

The data were obtained from the $alr4$ library of R.

References

Weisberg S. 2014. Applied Linear Regression. 4th edition. Hoboken NJ: Wiley

Examples

```
data(fishgrowth)
head(fishgrowth)
```

fishgrowth2 *Crecimiento de peces*

Description

Data on samples of small mouth bass collected in West Bearskin Lake, Minnesota, in 1991. The file wblake includes only fish of ages 8 or younger.

Usage

```
data(fishgrowth2)
```

Format

Contiene tres variables, como sigue:

edad Year at capture.

largo Length at capture, en mm.

escala radius of a key scale, en mm.

Source

Datos obtenidos desde el paquete $alr4$ de R.

References

Weisberg S. 2014. Applied Linear Regression. 4th edition. Hoboken NJ: Wiley

Examples

```
data(fishgrowth2)
head(fishgrowth2)
```

floraChile *Flora of Chile.*

Description

Dataset contains taxonomic level information segregatted by latitude.

Usage

```
data(floraChile)
```

Format

Contains seven columns, as follows:

family .
genus .
scientific.name .
author .
origin .
life.form .
lat... .

Source

The data are provided courtesy of Dr Jan Bannister at the Instituto Forestal (Chiloe, Chile).

References

- Bannister JR, Vidal OJ, Teneb E, Sandoval V. 2012. Latitudinal patterns and regionalization of plant diversity along a 4270-km gradient in continental Chile. Austral Ecology 37(4):500-509. doi: 10.1111/j.14429993.2011.02312.x

Examples

```
data(floraChile)
head(floraChile)
```

`floraChile2` *Flora de Chile.*

Description

Contiene informacion taxonomica segregada por latitude.

Usage

```
data(floraChile)
```

Format

Contains seven columns, as follows:

family .
genus .
scientific.name .
author .
origin .
life.form .
lat... .

Source

Datos cedidos por el Dr Jan Bannister del Instituto Forestal (Chiloe, Chile).

References

- Bannister JR, Vidal OJ, Teneb E, Sandoval V. 2012. Latitudinal patterns and regionalization of plant diversity along a 4270-km gradient in continental Chile. Austral Ecology 37(4):500-509. doi: 10.1111/j.14429993.2011.02312.x

Examples

```
data(floraChile2)
head(floraChile2)
```

`football` *Anaerobic potential of soccer players.*

Description

Data about anaerobic variables of football players.

Usage

```
data(football)
```

Format

The data frame contains 13 variables as follows:

WPM

WPMk

WPm

WPmk

WTT

WTTk

WIF

W5

W10

W15

W20

W25

W30

Source

Data were provided by Dr Aquiles Yanez-Silva at Universidad Mayor (Santiago, Chile).

References

Not yet.

Examples

```
data(football)
head(football)
```

`football2` *Potencia anaerobica de jugadores de football.*

Description

Datos sobre potencia anaerobica de jugadores de football.

Usage

```
data(football2)
```

Format

Contiene variables de nivel individual, como se describen a continuación::

WPM

WPMk

WPm

WPmk

WTT

WTTk

WIF

W5

W10

W15

W20

W25

W30

Source

Los datos fueron cedidos por el Dr Aquiles Yañez-Silva de la Universidad Mayor (Santiago, Chile).

References

Not yet.

Examples

```
data(football2)
head(football2)
```

`forestfire` *Data of forest fire occurrence*

Description

Data of forest fire occurrence from Altamirano et al. (2013) as our population, containing 7210 total observations (N), with only 890 cases of fire occurrence (N 1) and 6320 cases of non occurrence (N0). The binary variable (Y) is the occurrence of forest fire, where Y equal to 1 denotes occurrence and Y equal to 0 otherwise.

Usage

```
data(forestfire)
```

Format

The data frame contains four variables as follows:

fire Presence of forest fire (1 yes, 0 no)

xcoord Geographic coordinate x.utm

ycoord Geographic coordinate y.utm

aspect Exposure (degrees from north)

eleva Elevation (m)

slope Slope (degrees)

distr Distance to dirt roads

distcity Distance to cities

distriver Distance to paved roads

covera Land use classifications according to a polygon

coverb Land use classifications according to a polygon

tempe Minimum temperature of the coldest month

ppan Annual precipitation

ndii Normalized difference infrared index

nvdi Normalized difference vegetation index

tempe2 Minimum temperature of the warmest month

ppan2 Precipitation of the driest month

frec.fire Frequency of fires

perc.fire Percentage of fire frequency

fireClass Class for frecuency fire

asp.class Class of variable exposure

eleva.class Class of numerical variable elevation

slope.class Class of numerical variable slope

ndii.class Normalized difference infrared index class

nvdi.class Normalized difference vegetation index class

Source

Data were provided by Dr Adison Altamirano at the Universidad de La Frontera (Temuco, Chile).

References

- Altamirano A, Salas C, Yaitul V, Smith-Ramirez C, Avila A. 2013. Infuencia de la heterogeneidad del paisaje en la ocurrencia de incendios forestales en Chile Central. Revista de Geografia del Norte Grande, 55:157-170, 2013. -Salas-Eljatib C, Fuentes-Ramírez A, Gregoire TG, Altamirano A, Yaitul V. 2018. A study on the effects of unbalanced data when fitting logistic regression models in ecology. Ecological Indicators 85:502-508. doi: 10.1016/j.ecolind.2017.10.030

Examples

```
data(forestfire)
head(forestfire)
```

`forestfire2` *Datos de ocurrencia de incendios forestales*

Description

Datos de ocurrencia de incendios forestales de Altamirano et al. (2013) como nuestra poblacion, que contiene 7210 observaciones totales (N), con solo 890 casos de ocurrencia de incendios (N1) y 6320 casos de no ocurrencia (N0). La variable binaria (Y) es la ocurrencia de un incendio forestal, donde Y igual a 1 denota ocurrencia e igual a 0 en caso contrario.

Usage

```
data(forestfire2)
```

Format

Variables se describen a continuacion:

fire Presencia de incendio forestal (1 si, 0 no)
xcoord Coordenada geografica x.utm
ycoord Coordenada geografica y.utm
aspect Exposicion (grados desde el norte)
eleva Elevacion (m)
slope Pendiente (grados)
distr Distancia a caminos de tierra
distcity Distancia a ciudades
distriver Distancia a caminos pavimentados
covera Clasificaciones de uso del suelo segun un poligono
coverb Clasificaciones de uso del suelo segun un poligono
tempe Temperatura m?nima del mes m?s frio
ppan Precipitacion anual
ndii Indice infrarrojo de diferencia normalizado
nvdi Indice de vegetacion de diferencia normalizado
tempe2 Temperatura m?nima del mes mas calido
ppan2 Precipitacion del mes mas seco
frec.fire Frecuencia de incendios
perc.fire Porcentajede la frecuencia de incendios
fireClass Clase para variable frecuencia de incendio
asp.class Clase de variable exposicion
eleva.class Clase de variable numerica elevacion
slope.class Clase de variable numerica pendiente
ndii.class Clase de indice infrarrojo de diferencia normalizado
nvdi.class Clase de indice de vegetacion de diferencia normalizado

Source

Datos fueron cedidos por el Dr Christian Salas-Eljatib (Santiago, Chile).

References

- Altamirano A, Salas C, Yaitul V, Smith-Ramirez C, Avila A. 2013. Infuencia de la heterogeneidad del paisaje en la ocurrencia de incendios forestales en Chile Central. Revista de Geografia del Norte Grande, 55:157-170, 2013. -Salas-Eljatib C, Fuentes-Ramírez A, Gregoire TG, Altamirano A, Yaitul V. 2018. A study on the effects of unbalanced data when fitting logistic regression models in ecology. Ecological Indicators 85:502-508. doi: 10.1016/j.ecolind.2017.10.030

Examples

```
data(forestfire2)
head(forestfire2)
```

gmean *Function to compute the geometric mean of a vector*

Description

Computes the geometric mean of a numeric vector. It is the n-th root of the product of n numbers, as follows.

$$y_g = \left(\prod_{i=1}^{n} y_i \right)^{1/n}$$

for $y_i > 0$. It can also be understood as the average of the logarithmic values of a data set, converted back to a base 10 number. The geometric mean is a central position statistics of a random variable.

Usage

```
gmean(v)
```

Arguments

v	is a numeric vector

Details

Notice that can only be computed for positive values. For negative values, there are alternatives, but not covered here.

Value

This function returns the geometric mean, a numeric scalar.

Author(s)

Christian Salas-Eljatib.

References

Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
y.var <- runif(10, min=10, max=45)
gmean(y.var)
```

hawaii *Diameter growth increments of a tropical tree species in Hawaii*

Description

Tree size, competition, and diameter growth increment of *Metrosideros polymorpha* trees collected in the Kilauea Volcano, Hawaii. Data containing 64 observations at the current annual growth rate (defined as dbh increment within one calendar year) of each tree was measured from 1986 to 1988.

Usage

```
data(hawaii)
```

Format

The dataframe has the following columns:

tree.code Tree number identification. The first letter of the ID representsa cohort. Six cohorts representing a chronosequence were sampled.

dbh Initial stem diameter, in cm.

toth Total height, in m.

crown.area Crown outline area, in square meters.

comp.ind Competition index (Basal area of nearest neighbor divided by square of distance to nearest neighbor plus basal area of second nearest neighbor divided by square of distance to second nearest neighbor).

cai.1986 Current annual stem diameter increment during 1986, in mm.

cai.1987 Current annual stem diameter increment during 1987, in mm.

cai.1988 Current annual stem diameter increment during 1988, in mm.

Source

The data were obtained from Gerrish and Mueller-Dombois (1999).

References

Gerrish G, Mueller-Dombois D. 1999. Measuring stem growth rates for determining age and cohort analysis of a tropical evergreen tree. Pacific Science. 53(4): 418-429.

Examples

```
data(hawaii)
head(hawaii)
```

hawaii2 *Incremento corriente anual en diámetro de una especie tropical en Hawaii*

Description

Tamaño del árbol, competencia, e incremento corriente anual de árboles de *Metrosideros polymorpha* colectado en el volcan Kilauea, en Hawaii. Los datos contienen 64 observaciones de incremento corriente anual (definido como el incremento en diámetro en un año calendario) de cada árbol. Estos incrementos fueron medidos desde el año 1986 a 1988.

Usage

```
data(hawaii)
```

Format

Estos datos contienen las siguientes columnas:

arb.id Codigo identificador del árbol. La primera letra del ID representa un cohorte. Hay seis cohortes que representan una cronosecuencia.

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m.

area.copa Area de copa, en metros cuadrados.

ind.comp Competition index (Basal area of nearest neighbor divided by square of distance to nearest neighbor plus basal area of second nearest neighbor divided by square of distance to second nearest neighbor).

ica.1986 Incremento corriente anual durante el año 1986, en mm.

ica.1987 Incremento corriente anual durante el año 1987, en mm.

ica.1988 Incremento corriente anual durante el año 1988, en mm.

Source

Los datos fueron obtenidos desde Gerrish and Mueller-Dombois (1999).

References

Gerrish G, Mueller-Dombois D. 1999. Measuring stem growth rates for determining age and cohort analysis of a tropical evergreen tree. Pacific Science. 53(4): 418-429.

Examples

```
data(hawaii2)
head(hawaii2)
```

hgrdfir *Tree height growth of Douglas-fir sample trees in the Northwest of the United States*

Description

Data contains 148 observations on the height growth of dominant trees of Pseudotsguga mensiezzi in the Northwest of the United States.

Usage

```
data(hgrdfir)
```

Format

The data frame contains seven variables as follows:

natfor.id Code identifier.

plot.code Plot number identification

tree.code Tree number identification.

dbh Diameter at breast height at sampling, in in.

toth Total height at sa,pling, in ft.

age Age of tree, yr.

height Height at a given age, in ft.

Source

The data were provided by Dr Christian Salas.

References

- Monserud RA. 1984. Height growth and site index curves for Inland Douglas-fir based on stem analysis data and forest habitat type. Forest Science 30(4):943-965.

- Salas C, Stage AR, and Robinson AP. 2008. Modeling effects of overstory density and competing vegetation on tree height growth. Forest Science 54(1):107-122. doi: 10.1093/forestscience/54.1.107

Examples

```
data(hgrdfir)
head(hgrdfir)
unique(hgrdfir$tree.code)
table(hgrdfir$plot.code,hgrdfir$tree.code)
tapply(hgrdfir$dbh, hgrdfir$tree.code, mean)
tapply(hgrdfir$dbh, hgrdfir$tree.code, mean) #dbh of each sample tree
tapply(hgrdfir$toth, hgrdfir$tree.code, mean) #toth of each sample tree
```

hgrdfir2 *Crecimiento en altura de una muestra de árboles en los Estados Unidos*

Description

Data contiene 148 obserrvaciones sobre el crecimiento en altura de árboles dominantes de Pseudotsguga mensiezzi en el Nor-Oeste de los Estados Unidos

Usage

```
data(hgrdfir2)
```

Format

La data frame contiene siete variables:

bosque.id Codigo identificador del bosque.

parcela Codigo identificador de la parcela.

arbol Número de identificacion árbol.

dap Diámetro a la altura del pecho, en pulgadas.

atot Altura total, en pies

edad Edad, en os

altura Altura para cada edad del árbol, en pies

Source

La data fue cedida por el Dr Christian Salas-Eljatib.

References

Monserud RA. 1984. Height growth and site index curves for Inland Douglas-fir based on stem analysis data and forest habitat type. Forest Science 30(4):943-965.

Salas C, Stage AR, and Robinson AP. 2008. Modeling effects of overstory density and competing vegetation on tree height growth. Forest Science 54(1):107-122. doi: 10.1093/forestscience/54.1.107

Examples

```
data(hgrdfir2)
head(hgrdfir2)
unique(hgrdfir2$arbol.id)
table(hgrdfir2$parcela,hgrdfir2$arbol.id)
tapply(hgrdfir2$dap, hgrdfir2$arbol.id, mean) #dap de cada arbol muestra
tapply(hgrdfir2$atot, hgrdfir2$arbol.id, mean) #atot de cada arbol muestra
```

idahohd *Tree height-diameter data from Idaho (USA)*

Description

These data are forest inventory measures from the Upper Flat Creek stand of the University of Idaho Experimental Forest, dated 1991.

Usage

```
data(idahohd)
```

Format

Contains five variables, as follows:

plot Plot number.

tree Tree within plot.

species A factor with levels DF = Douglas-fir, GF = Grand fir, SF = Subalpine fir, WL = Western larch, WC = Western red cedar, WP = White pine.

dbh Diameter 137 cm perpendicular to the bole, cm.

height Height of the tree, in m.

Source

The data were assembled from the 'ufc' dataframe from the $alr4$ library.

References

Weisberg S. 2014. Applied Linear Regression. 4th edition. New York: Wiley.

Examples

```
data(idahohd)
head(idahohd)
plot(height~dbh, data=idahohd)
```

idahohd2 *Altura-diámetro de árboles en el estado de Idaho (USA)*

Description

Estos datos provienen de un muestreo en el bosque experimental de la University of Idaho, en Upper Flat Creek, Idaho, USA. Medido en 1991.

Usage

```
data(idahohd2)
```

Format

Contiene cinco variables detalladas a continuación:

parce Número de la parcela de muestreo.

arbol Número del árbol dentro de la parcela.

spp Especie del árbol, una variable factor con niveles DF = Douglas-fir, GF = Grand fir, SF = Subalpine fir, WL = Western larch, WC = Western red cedar, WP = White pine.

dap Diámetro del fuste a los 1.3 m sobre el suelo, en cm.

atot Altura del árbol, en m.

Source

Los datos fueron obtenidos desde la dataframe 'ufc' de la librería $alr4$.

References

Weisberg S. 2014. Applied Linear Regression. 4th edition. New York: Wiley.

Examples

```
data(idahohd2)
head(idahohd2)
plot(atot~dap, data=idahohd2)
```

`invasivesRCI` *Contains regeneration microsite data in Robinson Crusoe Island forest*

Description

These are plot-level measurement (2x2 m) data from the forests in the Robinson Crusoe Island, located in the Pacific Ocean, 667 km from mainland Chile. Measurements were collected in transects of 100 to 240 meters in which, 398 squared plots (2x2 m) were set to include canopy gaps, gap borders and closed forest conditions.

Usage

```
data(invasivesRCI)
```

Format

Data has the following columns

plot.id Plot identification code

Gap.type Canopy gap classified as invaded=Inv, non invaded= Nat or treated =Treat(considering the estimated cover of invasive plant species)

Forest.zone Location of the plot (gap, border or forest)

Ferns Estimated cover of fern species (in 2x2 plots)

Moss.liverw Estimated cover of mosses and liverworts (in 2x2 plots)

Cwd Estimated cover of coarse woody debris > 3 cm diameter (in 2x2 plots)

Litter Estimated cover of litter (in 2x2 plots)

Ms Estimated cover of mineral soil (in 2x2 plots)

Rock Estimated cover of rocks (in 2x2 plots)

Est.age Age category for the canopy gap associated to each plot

Source

The data are provided courtesy of Prof. Rodrigo Vargas-Gaete at Universidad de La Frontera (Temuco, Chile).

References

Vargas-Gaete R, Salas-Eljatib C, Gärtner SM, Vidal OJ, Bannister JR, Pauchard A. 2018. Invasive plant species thresholds in the forests of Robinson Crusoe Island, Chile. Plant Ecology & Diversity, 11(2), 205-215.

kurto *Computes the sample kurtosis of a distribution*

Description

The kurtosis is about the tailedness, or the degree of heaviness of the tails, in the frequency distribution. The function computes an estimator of the kurtosis.

Usage

```
kurto(x, na.rm = TRUE)
```

Arguments

x	a numeric vector of a random variable.
na.rm	logical operator to remove NA values. The default is set to TRUE.

Details

The kurtosis of a random variable is the fourth moment of the standardized variable. There are several ways of parameterizing a kurtosis estimator, such as depending on the fourth moment and the standard deviation of the random variable.

Value

An estimator of the kurtosis.

Author(s)

Christian Salas-Eljatib

Examples

```
y.var<-rnorm(100);x.var<-rbeta(100,.2,2)
kurto(y.var)
kurto(x.var)
```

`landcover` *Land-cover, environmental and sociodemographic data for the 34 municipalities composing the Greater Santiago area, Santiago, Chile.*

Description

dataset contains 476 observations, 34 categorical and 442 numerical. Land-cover data was generated through remote sensing classification techniques using Sentinel-2 satellite images from year 2016. Temperatures were obtained from TIRS band 10 of Landsat 8 satellites images. Particulate matter concentrations were estimated using spatial modelling techniques from 10 pollution stations distributed in the city. Altitude was generated from a Digital Elevation Model. Population and poverty were gathered from Casen 2017 survey.

Usage

```
data(landcover)
```

Format

The data frame contains four variables as follows:

county Name of Municipality

built.p Percentage of surface covered by built-up area

vegeta.p Percentage of surface covered by vegetation

naked.p Percentage of surface covered by bare soil

grass.p Percentage of surface covered by deciduous vegetation

p.Deciduo Percentage of surface covered by evergreen vegetation

p.Siempreverde Percentage of surface covered by evergreen vegetation

temp.winter Land surface temperature in celsius degrees at 2pm on a winter 0% cloud day

temp.summer Land surface temperature in celsius degrees at 2pm on a summer 0% cloud day

pm10.winter Average particulate matter 10 micron during winter months

pm10.summer Average particulate matter 10 micron during summer months

poor.p Percentage of people under poverty line year 2017.

eleva Average altitude of municipal area.

pop Total population of municipality

Source

Data were provided by Dr Ignacio Fernandez at Universidad Adolfo Ibañez (Santiago, Chile).

References

Not yet

Examples

```
data(landcover)
head(landcover)
```

`landcover2` *Cobertura territorial, ambiental y sociodemografica de los 34 municipios que componen el area del Gran Santiago, Santiago, Chile..*

Description

El conjunto de datos contiene 476 observaciones, 34 categoricas y 442 numericas. Los datos de cobertura terrestre se generaron mediante tecnicas de clasificacion de teledeteccion utilizando imagenes de satelite Sentinel-2 del año 2016. Las temperaturas se obtuvieron de la banda TIRS 10 de las imagenes de los satelites Landsat 8. Las concentraciones de material particulado se estimaron mediante tecnicas de modelado espacial de 10 estaciones de contaminacion distribuidas en la ciudad. La altitud se genero a partir de un modelo de elevacion digital. La poblacion y la pobreza se obtuvieron de la encuesta Casen 2017.

Usage

```
data(landcover2)
```

Format

Variables se describen a continuacion:

comuna Name of Municipality

const.p Porcentaje de superficie cubierta por area construida

vegeta.p Porcentaje de superficie cubierta por vegetacion

desnu.p Porcentaje de superficie cubierta por suelo desnudo

pasto.p Porcentaje de superficie cubierta por cesped

deci.p Porcentaje de superficie cubierta por vegetacion de hoja caduca

sverde.p Porcentaje de superficie cubierta por vegetacion siempre verde

temp.inv Temperatura de la superficie terrestre en grados celsius a las 2 p.m.en un dia de invierno con 0% de nubes

temp.ver Temperatura de la superficie de la tierra en grados celsius a las 2 p.m.en un dia de verano con 0% de nubes

pm10.inv Material particulado promedio de 10 micrones durante los meses de invierno

pm10.ver Material particulado promedio de 10 micrones durante los meses de verano

pobreza.p Porcentaje de personas por debajo de la linea de pobreza año 2017

altitud Altitud media del termino municipal

pob Poblacion total del municipio

Source

Los datos fueron cedidos por el Dr Ignacio Fernandez de la Universidad Adolfo Ibañez (Santiago, Chile).

References

Not yet

Examples

```
data(landcover2)
head(landcover2)
```

`largetrees` *Large trees in forests near Tolga, in Eastern Norway.*

Description

The study area is situated in the municipality of Tolga, located in Hedmark County, Eastern Norway. Field plots 32 m × 32 m in size were established in forests. A total of 1109 plots were sampled. In each plot, Scots pines (Pinus sylvestris L.). trees with a stem diameter larger than 35 cm were measured and counted.

Usage

```
data(largetrees)
```

Format

Contains two variables, as follows:

plot Plot code.

y Number of large-diameter trees in a given sample plot.

Source

Although Christian Salas was part of the study, he just reproduced the needed data to mimic the distribution of the random variable of interest, as shown in the study of Korkhonen et al (2016).

References

- Korhonen L, Salas C, Ostgard T, Lien V, Gobakken T, Naesset E. 2016. Predicting the occurrence of large-diameter trees using airborne laser scanning. Canadian Journal of Forest Research 46:461–469. doi: 10.1139/cjfr20150384

Examples

```
data(largetrees)
head(largetrees)
hist(largetrees$y)
```

`largetrees2` *Árboles grandes en bosques cercanos a Tolga, en el Este de Noruega.*

Description

El área de estudio esta ubicada en la municiplaidad de Tolga, en la comuna de Hedmark, al Este de Noruega. 1109 parcelas de muestreo de 32 m × 32 m se establecieron en los bosques. En cada parcela, los árboles de pino escoses (Pinus sylvestris L.). que tuvieran un diámetro mayor a 35 cm fueron medidos y contados.

Usage

```
data(largetrees2)
```

Format

Los datos poseen las siguientes dos columnas:

parc Identificador de la parcela de muestreo.

y Número de árboles de gran diámetro encontrados en una parcela de muestreo.

Source

Aunque el Prof. Christian Salas fue parte del estudio, acá se han reproducido los datos necesarios que imitan la distribución de la variable aleatoria de interés, tal como se muestra en el estudio de Korkhonen et al (2016).

References

- Korhonen L, Salas C, Ostgard T, Lien V, Gobakken T, Naesset E. 2016. Predicting the occurrence of large-diameter trees using airborne laser scanning. Canadian Journal of Forest Research 46:461–469. doi: 10.1139/cjfr20150384

Examples

```
data(largetrees2)
head(largetrees2)
hist(largetrees2$y)
```

`llancahue` *Tree locations for a sample plot in the Llancahue experimental forest*

Description

The Cartesian position, species, and diameter of trees within a plot were measured. The sample plot is rectangular of 130 m by 70 m. Further details can be #' reviewed in the reference.

Usage

```
data(llancahue)
```

Format

Contains tree-level variables, as follows:

tree.code Tree identificator

spp species abreviation as follows: AP=Aextocicon puncatatum, EC=Eucryphia cordifolia, GA=Gevuina avellana, LP=Laureliopsis philippiana, LS=Laurelia sempervirens, ND=Nothofagus dombeyi, Ot=Other, PS=Podocarpus saligna

dbh diameter at breast height, in cm.

x.coord Cartesian position in the X-axis, in m.

y.coord Cartesian position in the Y-axis, in m.

Source

The data are provided courtesy of Prof. Daniel Soto at Universidad de Aysen (Coyhaique, Chile).

References

- Soto DP, Salas C, Donoso PJ, Uteau D. 2010. Heterogeneidad estructural y espacial de un bosque mixto dominado por Nothofagus dombeyi después de un disturbio parcial. Revista Chilena de Historia Natural 83(3): 335-347.

Examples

```
data(llancahue)
head(llancahue)
descstat(llancahue$dbh)
boxplot(dbh~spp, data=llancahue)
```

`llancahue2` *Ubicación cartesiana de árboles en el bosque de Llancahue*

Description

Corresponde a la posición cartesiana, especie, y diámetro de árboles en una parcela de muestreo en el bosque de Llancahue, cerca de Valdivia, Chile. La parcela es rectangular con dimensiones de 130 m por 70 m. Mayores antecedentes aparecen en las referencias.

Usage

```
data(llancahue2)
```

Format

Contains tree-level variables, as follows:

arb.id Identificador del árbol.

spp Codificación de la especie como sigue: AP= Aextocicon puncatatum, EC=Eucryphia cordifolia, GA=Gevuina avellana, LP=Laureliopsis philippiana, LS=Laurelia sempervirens, ND=Nothofagus dombeyi, Ot=Other, PS=Podocarpus saligna.

dap Diámetro a la altura del pecho, en cm.

coord.x Posición cartesiana en el eje-X, en m.

coord.y Posición cartesiana en el eje-Y, en m.

Source

Los datos fueron cedidos por el Prof. Daniel Soto de Universidad de Aysen (Coyhaique, Chile).

References

- Soto DP, Salas C, Donoso PJ, Uteau D. 2010. Heterogeneidad estructural y espacial de un bosque mixto dominado por Nothofagus dombeyi después de un disturbio parcial. Revista Chilena de Historia Natural 83(3): 335-347.

Examples

```
data(llancahue2)
head(llancahue2)
descstat(llancahue2$dap)
boxplot(dap~spp, data=llancahue2)
```

`lleuque` *Contains tree density by species and plot for Prumnopitys andina (Lleuque) forests*

Description

Contains species composition data for forests with presence of Lleuque (Prumnopitys andina)

Usage

```
lleuque
```

Format

The dataframe has the following columns

stand Stand number

plot.num Sample plot number

cipres Tree density of ciprés de la Cordillera (Austrocedrus chilensis), in trees/ha.

ldura Tree density of leña dura (Maytenus disticha), in trees/ha.

roble Tree density of roble (Nothofagus obliqua), in trees/ha.

lleuque Tree density of lleuque (Prumnopitys andina), in trees/ha.

Source

The data are provided courtesy of Prof. Rodrigo Vargas-Gaete at Universidad de La Frontera (Temuco, Chile).

References

Vargas-Gaete R, Salas-Eljatib C, Penneckamp D, Neira Z, Diez MC, Vargas-Picón, R. 2020. Estructura y regeneración de bosques de Prumnopitys andina en los Andes del sur de Chile. Gayana Botánica 77(1):48-58. doi: 10.4067/S0717664320200001000048

`lleuque2` *Densidad por especie de árboles por parcela en bosques de *Prumnopitys andina* (Lleuque)*

Description

Para cada unidad de muestreo (o parcela) hay valores de densidad por especie arbórea. Las parcelas fueron establecidas en bosques de *Prumnopitys andina* (Lleuque) forests

Usage

```
lleuque2
```

Format

Los datos contienen las siguientes columnas:

rodal Rodal, en código.

parce Parcela de muestreo, en código.

cipres Densidad de Ciprés de la Cordillera (Austrocedrus chilensis), en arb/ha.

ldura Densidad de leña dura (Maytenus disticha), en arb/ha.

roble Densidad de roble (Nothofagus obliqua), en arb/ha.

lleuque Densidad de lleuque (Prumnopitys andina), en arb/ha.

Source

Los datos fueron cedidos por el Prof. Rodrigo Vargas-Gaete de la Universidad de La Frontera (Temuco, Chile).

References

Vargas-Gaete R, Salas-Eljatib C, Penneckamp D, Neira Z, Diez MC, Vargas-Picón, R. 2020. Estructura y regeneración de bosques de Prumnopitys andina en los Andes del sur de Chile. Gayana Botánica 77(1):48-58. doi: 10.4067/S0717664320200001000048

---

lrt *Computes a likelihood ratio test between a reduced model and a full model*

Description

Computes a likelihood ratio test between a reduced model (modr) and a full model (modf). Both models must be previously fitted by maximum likelihood.

Usage

```
lrt(modr, modf)
```

Arguments

modr	is a previously fitted model having less parameters than modf
modf	is a previously fitted model having more parameters than modr

Details

Double-check the order of the reduced and full model, before of using the model

Value

This function returns an object having the following elements: "loglik.Modr" maximized log-likelihood of modr; "loglik.Modf" maximized log-likelihood of modf; "dif.loglik" difference in log-likelihood between both models, and "dif.df" difference in degrees of freedong of both models, and "p-value" is the p-value for the LRT.

Author(s)

Christian Salas-Eljatib.

References

Pinheiro JC, and Bates DM. 2000. Mixed-effects models in S and Splus. Springer-Verlag, New York, NY. 528 p.

Examples

```
#not yet implemented
```

---

moda *Computes the mode*

Description

Computes the mode of a random variable.

Usage

```
moda(y = y)
```

Arguments

y	is a numeric vector.

Details

The mode is an statistics representing the most "used" value of the random variable as a way of central position.

Value

The function returns the mode, a numeric scalar.

Author(s)

Christian Salas-Eljatib.

Examples

```
set.seed(1234)
variable <- rnorm(10, mean=45,sd=6)
#using the function
moda(y=variable)
moda(variable)
```

---

pcontorta *Contains spatial location of Pinus contorta trees in sample plots.*

Description

These are tree-level measurement data, with cartesian location of each tree, from Pinus contorta invasion in Patagonian steppe in Coyhaique in southhern Chile, measured in 2011. There are 3 plots, each of 10.000 m^2.

Usage

```
data(pcontorta)
```

Format

Contains eight variables, as follows:

plot.id Plot sample ID.

tree.id Tree identificator number in each plot. Same indv/id for multi-stem trees.

y.coord coordinate of S latitude.

x.coord coordinate of W longitude.

substrate Ground cover in which each pine grow. Bare soil, Festuca pallescens, Baccharis magellanica, Oreopulus glacialis, Acaena integerrima and others species.

drc Diameter at the root collar on trees, in mm.

h Height of trees, in cm.

canopy.area Proyection of canopy area of each tree, in square meters.

Source

The data are provided courtesy of Drs Anibal Pauchard and Rafael Garcia at the Laboratorio de Invasiones Biologicas, Universidad de Concepción (Concepción, Chile).

References

Pauchard A, Escudero A, García RA, de la Cruz M, Langdon B, Cavieres LA, Esquivel J. 2016. Pine invasions in treeless environments: dispersal overruns microsite heterogeneity. Ecology and Evolution. 6(2): 447-459.

Examples

```
data(pcontorta)
head(pcontorta)
unique(pcontorta$plot.id)
```

`pcontorta2` *Ubicación espacial de árboles de Pinus contorta en parcela de muestreo*

Description

Mediciones a nivel de árbol, con la ubicación cartesian de cada árbol de Pinus contorta, en parcelas de muestreo para estudio de invasion en la estepa Patagonica en Coyhaique en el sur de Chile. Hay tres parcelas, cada una de 10.000 m^2.

Usage

```
data(pcontorta2)
```

Format

Contiene ocho variables, como siguen:

parcela Parcela.

arbol Número de árbol en cada parcela. Mismo árbol/id para árboles multifustales.

coord.y coordinada de latitud W.

coord.x coordinada de longitud W.

substrato Cobertura del suelo donde cada pino crece. Bare soil, Festuca pallescens, Baccharis magellanica, Oreopulus glacialis, Acaena integerrima and others species.

h Height of trees, in cm.

diam.cuello Diámetro del cuello, en mm.

area.copa Area de copa, en m^2.

Source

Los datos fueron cedidos por los Drs. Anibal Pauchard y Rafael Garcia del Laboratorio de Invasiones Biologicas, Universidad de Concepcion (Chile).

References

Pauchard A, Escudero A, Garcia RA, de la Cruz M, Langdon B, Cavieres LA, Esquivel J. 2016. Pine invasions in treeless environments: dispersal overruns microsite heterogeneity. Ecology and Evolution. 6(2): 447-459. doi: 10.1002/ece3.1877

Examples

```
data(pcontorta2)
head(pcontorta2)
unique(pcontorta2$plot.id)
```

`pinaster` *Tree volume for Pinus pinaster in the Baixo-Mino, Galicia, Spain.*

Description

These are volume measurements data of sample trees in the Baixo-Mino region in Galicia, Spain.

Usage

```
data(pinaster)
```

Format

Contains tree-level variables, as follows:

stand stand number from the sample tree was selected.

si Site index of the stand.

tree.no tree number.

dbh Diameter at breast height, in cm.

toth Total height, in m.

d4 Upper-stem diameter at 4 m, in cm.

volwb Tree gross volume, in m^3 with bark.

volwob Tree gross volume, in m^3 without bark.

Source

The data are provided courtesy of Dr Christian Salas-Eljatib at the Universidad de Chile (Santiago, Chile).

References

- Salas C, Nieto L, Irisarri A. 2005. Modelos de volumen para Pinus pinaster Ait. en la comarca del Baixo Mino, Galicia, España. Quebracho 12: 11-22. https://eljatib.com/publication/2005-12-01_modelos_de_volumen_p/

Examples

```
data(pinaster)
head(pinaster)
```

pinaster2 *Volumen individual de árboles de Pinus pinaster en Galicia, España.*

Description

Variables de volumen y otras a nivel de árbol para una muestra de árboles de Pinus pinaster en la comarca del Baixo-Mino en Galicia, España.

Usage

```
data(pinaster2)
```

Format

Contiene las siguientes variables a nivel de árbol:

rodal Rodal desde donde el árbol fue muestreado

ind.sitio Indice de sitio del rodal, en m.

arbol Número del árbol.

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m.

d4 Diámetro fustal a los 4 m, en cm.

vtcc Volumen bruto total con corteza, en m^3.

vtsc Volumen bruto total sin corteza, en m^3.

Source

Los datos fueron cedidos por el Dr Christian Salas (Chile).

References

- Salas C, Nieto L, Irisarri A. 2005. Modelos de volumen para Pinus pinaster Ait. en la comarca del Baixo Miño, Galicia, España. Quebracho 12: 11-22. https://eljatib.com/publication/2005-12-01_modelos_de_volumen_p/

Examples

```
data(pinaster2)
head(pinaster2)
```

`pinusSpp` *Tree-level variables of several sample plots of invasive Pinus spp in Chile.*

Description

These are tree-lavel measurement data from Pinus spp invasion in *Araucaria-Nothofagus* forests in the Malalcahuello National Reserve in La Araucania region in southhern Chile, measured in 2012. There are 26 plots and plot size is 100 m^2.

Usage

```
data(pinusSpp)
```

Format

Contains eight variables, as follows:

plot.id Plot sample ID.

plot.size Plot size, en m^2.

lat.s Decimal coordinate of S latitude.

long.w Decimal coordinate of W longitude.

indv.id Tree identificator number in each plot. Same indv/id for multi-stem trees.

stem.id Stem identificator number in each plot.

spp Specie.

dbh Diameter at breast-height, in cm.

toth Total height, in m.

hcb Height to crown base, in m.

crown.lenght Crown lenght, in m.

Source

The data are provided courtesy of Drs Anibal Pauchard and Rafael García at the Laboratorio de Invasiones Biológicas, Universidad de Concepcion (Concepción, Chile).

References

Cobar-Carranza A, Garcia R, Pauchard A, Pena E. 2014. Effect of Pinus contorta invasion on forest fuel properties and its potential implications on the fire regime of Araucaria araucana and Nothofagus antarctica forests. Biological Invasions. 16(11): 2273-2291. doi: 10.1007/s10530014-06638

Examples

```
data(pinusSpp)
head(pinusSpp)
length(unique(pinusSpp$plot.id))
boxplot(dbh~plot.id, data=pinusSpp)
```

`pinusSpp2` *Variables a nivel de árbol en parcelas de muestreo de Pinus spp en Chile.*

Description

Mediciones a nivel de árbol para estudiar la invasion de Pinus spp en bosques de Araucaria-Nothofagus en la Reserva Nacional Malalcahuello en la region de la Araucania en el sur de Chile. Hay 26 parcelas, y la superficie de cada una es de 100 m^2.

Usage

```
data(pinusSpp2)
```

Format

Los datos contienen ocho columnas que se detallan a continuacion:

parcela Número de la parcela.

sup.parcela Superficie de la parcela, en m^2.

lat.s Decimal coordinate of S latitude.

long.w Decimal coordinate of W longitude.

indv.id Identificador del árbol en la parcelaeach plot. Same indv/id for multi-stem trees.

fuste.id Identificador del fuste.

espe Especie.

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m.

hcc Altura comienzo de copa, en m.

largo.copa Largo de copa, en m.

Source

Los datos fueron cedidos por los Drs. Anibal Pauchard y Rafael García del Laboratorio de Invasiones Biológicas, Universidad de Concepción (Concepción, Chile).

References

Cobar-Carranza A, Garcia R, Pauchard A & Pena E. 2014. Effect of Pinus contorta invasion on forest fuel properties and its potential implications on the fire regime of *Araucaria araucana* and Nothofagus antarctica forests. Biological Invasions. 16(11):2273-2291. doi: 10.1007/s10530014-06638

Examples

```
data(pinusSpp2)
head(pinusSpp2)
length(unique(pinusSpp2$parce))
boxplot(dap~parce, data=pinusSpp2)
```

---

presenceIce *Presence or absence of sea ice from logbook records of annual cruises*

Description

Data containing 52717 observations about presence of sea ice from logbook records of annual cruises to the B-C-B in an unbroken record between years 1850 to 1910.

Usage

```
data(presenceIce)
```

Format

The dataframe contains the following columns:

ship.id The code number for ships.

move.type Type of movement of ships. 0 indicates a sail-powered vessel and 1 indicates an auxiliary-powered vessel.

year Year of registry.

month Month of registry.

day Day of registry.

lat.dec Decimal latitude.

long.dec Decimal longitude.

e.w East or west of the Prime Meridian.

ice.cov Sea Ice Observed. 0 no see (Not registered) and 1 presence sea ice (Registered).

Source

The data were provided from Sea Ice Group at the Geophysical Institute.

References

Mahoney A, Bockstoce J, Botkin D, Eicken H, Nisbet R. 2011. Sea-Ice Distribution in the Bering and Chukchi Seas: Information from Historical Whaleships' Logbooks and Journals ARCTIC. 64(4): 465-477.

Examples

```
data(presenceIce)
head(presenceIce)
```

president *Eleccion presidencial del 2021 en Chile.*

Description

Datos de mesa de la eleccion presidencial del 2012 en Chile. La eleccion se llevo a cabo el 19 de Diciembre del 2021.

Usage

```
data(president)
```

Format

Los datos contienen las siguientes columnas:

region.no Número de la region adminsitrativa de Chile.

region Nombre de la region administrativa de Chile

provincia Provincia.

circu.senatorial Circunscripcion senatorial.

distrito Distrit.

comuna County.

circu.elec Circunscripcion electoral.

local Local de votacion. Generalmente es un colegio.

no.mesa Número de mesa.

tipo.mesa Tipo de mesa de votacion.

mesas.fusionadas Mesa de votacion fucionada.

electores Electores.

nro.en.voto .

candidato Candidato, ya sea Gabriel Boric o Jose A. Kast

votos.tricel Número total de votos segun el TRICEL (Tribunal calificador de elecciones).

Source

Los datos fueron obtenidos desde el sitio web del Servicio Electoral del Gobierno de Chilean (SERVEL) en https://www.servel.cl. El archivo de datos descargado el 24 de Octubre del 2022 tenia el nombre Resultados mesa presidencial TRICEL 2v 2021-1.xlsx.

Examples

```
data(president)
head(president)
```

primary *Elección primaria para la presidencia de Chile*

Description

Datos a nivel de mesa de la votación para elecciones primarias para Presidente de Chile en 2021.

Usage

```
data(primary)
```

Format

Este set de datos contiene las siguientes columnas:

region.no Región administrativa de Chile.
region Nombre de la región.
provincia Provincia.
distrito Distrito.
comuna Comuna.
circu.elec Circunscripción electoral.
local Local de votación.
tipo.mesa tipo de mesa.
mesa Código identificador de la mesa.
mesas.fusionadas Mesas fusionadas.
nro.voto .
lista Lista política del candidato.
pacto Pacto político del candidato.
partido Partido político del candidato.
candidato Nombre del candidato.
votos Número total de votos.

Source

Los datos fueron obtenidos desde el servicio electoral de Chile (SERVEL) en el web https://www.servel.cl. El nombre del archivo era Resultados Primarias Presidenciales 2021 CHILE.xlsx, y fue descargado el 4 de octubre del 2022. Los datos fueron ordenados, y solo aquellas filas que contenian información en la columna 'votos' son parte de la dataframe.

Examples

```
data(primary)
head(primary)
table(primary$region)
table(primary$region,primary$candidato)
tapply(primary$votos,primary$candidato,sum)
```

pspruca *Tree spatial coordinates in the Rucamanque forest*

Description

Tree-level variables and spatial coordinates in a permanent sample plot of 1 ha (100 x 100m) in the Rucamanque experimental forest, near Temuco, Chile.

Usage

```
data(pspruca)
```

Format

The data frame contains four variables for the standing-alive trees as follows:

tree.no tree number

species Species name, "N. obliqua" is Nothofagus obliqua, "Ap" is Aexitocicum puncatatum, etc.

crown.class Crown class (1: superior, 2: intermediate, 3; inferior)

dbh diameter at breast-height, in cm

x.coord Cartesian position at the X-axis, in m

y.coord Cartesian position at the Y-axis, in m

Source

Data were provided by Dr Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

References

Salas C, LeMay V, Nunez P, Pacheco P, and Espinosa A. 2006. Spatial patterns in an old-growth Nothofagus obliqua forest in south-central Chile. Forest Ecology and Management 231(1-3): 38-46. doi: 10.1016/j.foreco.2006.04.037

Examples

```
data(pspruca)
head(pspruca)
table(pspruca$species)
```

pspruca2 *Ubicación espacial de árboles en el bosque de Rucamanque*

Description

Medidas a nivel de árbol y coordenadas espaciales en un parcela de muestreo permanente de 1 ha (100 x 100m) en el bosque de Rucamanque, cerca de Temuco, Chile. Mayores antecedentes en las referencias.

Usage

```
data(pspruca2)
```

Format

Las columnas describen características de los árboles vivos en pie, como sigue:

arbol Número del árbol

especie Nombre de la especie, "N. obliqua" es Nothofagus obliqua, "Ap" es Aexitocicum puncatatum, etc.

clase.copa Clase de copa (1: superior, 2: intermedio, 3; inferior)

dap Diámetro a la altura del pecho, en cm

coord.x Posicion cartesiana en el eje X, en m

coord.y Posicion cartesiana en el eje Y, en m

Source

Los datos fueron cedidos por el Dr Christian Salas-Eljatib (Santiago, Chile).

References

Salas C, LeMay V, Nunez P, Pacheco P, and Espinosa A. 2006. Spatial patterns in an old-growth Nothofagus obliqua forest in south-central Chile. Forest Ecology and Management 231(1-3): 38-46. doi: 10.1016/j.foreco.2006.04.037

Examples

```
data(pspruca2)
table(pspruca2$especie)
```

ptaeda *Height growth of Pinus taeda (Loblolly pine) trees*

Description

The Loblolly data frame has 84 rows and tree columns of records of the tree height growth of Loblolly pine trees. This dataframe is a slight modification to the original dataframe "Loblolly" from the $datasets$ R package.

Usage

```
data(ptaeda, package="datana")
```

Format

A dataframe containing the following columns:

seed.id an ordered factor indicating the seed source for the tree. The ordering is according to increasing maximum height.

age a numeric vector of tree ages, in yr.

toth a numeric vector of tree heights, in m.

Source

Pinheiro, J. C. and Bates, D. M. (2000) Mixed-effects Models in S and S-PLUS. Springer.

Examples

```
data(ptaeda, package="datana")
head(ptaeda)
plot(toth ~ age, data = subset(ptaeda, seed.id == 329),
     xlab = "Age (yr)", las = 1,
     ylab = "Height (m)")
```

ptaeda2 *Crecimiento en altura de Pinus taeda*

Description

Esta dataframe contiene 84 folas y tres columnas de crecimiento en altura de árboles de Pinus taeda (Loblolly pine). Es una modificación de la dataframe "Loblolly" del paquete 'datasets' de R.

Usage

```
data(ptaeda2)
```

Format

Los datos contienen las siguientes columnas:

semilla.id Un factor indicando el origen de la semilla del árbol.

edad Edad del árbol, en años.

atot Altura total, en m.

Source

Pinheiro, J. C. and Bates, D. M. (2000) Mixed-effects Models in S and S-PLUS. Springer.

Examples

```
data(ptaeda2, package="datana")
head(ptaeda2)
plot(atot ~ edad, data = subset(ptaeda2, semilla.id == 329),
     xlab = "Edad (años)", las = 1,
     ylab = "Altura (m)")
```

---

pvalt *Obtain the P-value for a Standard t-distributed random variable*

Description

Function to compute the P-value for a Standard t-distributed random variable.

Usage

```
pvalt(t.value, df, decnum = 5)
```

Arguments

t.value	A numeric random variable following a t-student pdf distribution.
df	degrees of freedom of the random variable following a t-student pdf distribution.
decnum	the number of decimals to be used in the output. The default is set to 5.

Details

It is suited to compute the P-value for any random variable following a Standard t probability density function. For instance, to obtain the p-value in a t-test.

Value

The function returns the P-value or probability of getting a value as large as t.value.

Author(s)

Christian Salas-Eljatib

Examples

```
## Load dataset
df <- datana::araucaria
#
## Computes the t-test statistics (from the 'stats' package)
t.value <- stats::t.test(df$hdom)
t.v <- as.numeric(t.value$statistic)
deg.f <- as.numeric(t.value$parameter)

## Obtaining the p value
pvalt(t.v,deg.f)
```

---

pvalz *Obtain the P-value for a Standard Gaussian random variable*

Description

Function to computes the P-value for a Standard Gaussian random variable.

Usage

```
pvalz(zval, decnum = 5)
```

Arguments

zval	A numeric random variable following a Standard Gaussian distribution.
decnum	the number of decimals to be used in the output. The default is set to 5.

Details

It is suited to compute the P-value for any random variable following a Standard Gaussian probability density function.

Value

This function returns the P-value or probability of getting a value as large as 'zval'.

Author(s)

Christian Salas-Eljatib

Examples

```
pvalz(1.96)
```

`radiatapl` *Sampling plots data from a Pinus radiata plantation near Capitan Pastene, Region de La Araucania, Chile.*

Description

Tree-level information collected within sample plots in a forestry plantation of Pinus radiata near Capitan Pastene, in southern Chile. Sample plots size is 150 m^2.

Usage

```
data(radiatapl)
```

Format

The data frame contains four variables as follows:

plot Plot number identification.

tree Tree number identification.

dbh Diameter at breast height, in cm.

heigth Total height, in m.

Source

The data are provided courtesy of Mr. Mauricio Lobos-Beneventi (Temuco, Chile).

Examples

```
data(radiatapl)
head(radiatapl)
```

`radiatapl2` *Datos a nivel de árbol de parcelas de muestreo en plantaciones de Pinus radiata*

Description

Es un listado de árboles con características medidas dentro de unidades de muestreo en una plantación de Pinus radiata cercana a Capitan Pastene, Region de la Araucania, Chile. Las parcelas de muestreo tienen 150 m^2.

Usage

```
data(radiatapl2)
```

Format

Los datos contienen las siguientes columnas

parce Número de identificación de la parcela de muestreo.

arbol Número de identificación del árbol dentro de la parcela.

dap Diámetro a los 1.3 m en el fuste, en cm.

atot Altura total, en m. Solo registrada para algunos árboles muestra.

Source

Los datos son cortesía del Ing. Forestal Mauricio Lobos-Beneventi (Temuco, Chile).

Examples

```
data(radiatapl2)
head(radiatapl2)
```

---

raulihg *Height growth of Nothofagus alpina trees in Chile.*

Description

Time series data of height for rauli (Nothofagus alpina) trees in south-central Chile. These sampled trees are part of the ones used in Salas-Eljatib (2021, Ecological Applications). The full citation is provided below.

Usage

```
data(raulihg)
```

Format

The data frame contains four variables as follows:

tree.code tree id code

spp species common name

bha.t breast-height age, in yrs.

h.t total height, in m.

Source

Data were provided by Dr Christian Salas-Eljatib (Santiago, Chile).

References

- Salas-Eljatib C. 2021. An approach to quantify climate-productivity relationships: an example from a widespread Nothofagus forest. Ecological Applications 31(4): e02285. doi: 10.1002/eap.2285

- Salas-Eljatib, C. 2021. Time series height-data for Nothofagus alpina trees. doi: 10.6084/m9.figshare.13521602.v5

Examples

```
data(raulihg)
head(raulihg)
```

`raulihg2` *Crecimiento en altura de árboles de Nothofagus alpina.*

Description

Datos de series de tiempo de altura para árboles muestreados de Nothofagus alpina (raulí) en el centro-sur de Chile. Estos árboles son parte de los usados en Salas-Eljatib (2021, Ecological Applications). La cita completa se da en referencias.

Usage

```
data(raulihg2)
```

Format

Contiene variables de nivel individual, como se describen a continuacion::

tree.code Codigo del árbol

spp Nombre comun especie

bha.t Edad a la altura del pecho, en años.

h.t Altura total, en m.

Source

Datos cedidos por el Prof. Christian Salas-Eljatib.

References

- Salas-Eljatib C. 2021. An approach to quantify climate-productivity relationships: an example from a widespread Nothofagus forest. Ecological Applications 31(4): e02285. doi: 10.1002/eap.2285

- Salas-Eljatib C. 2021. Time series height-data for Nothofagus alpina trees. doi: 10.6084/m9.figshare.13521602.v5

Examples

```
data(raulihg2)
head(raulihg2)
```

regNothofagus *Contains information about regeneration of Nothofagus seedlings.*

Description

Dataset contains 442 observations.

Usage

```
data(regNothofagus)
```

Format

Contains 15 variables, as follows:

site Id site of study.

plot Number of plot.

scar Scarification in percentage of total area.

x.trans.total Transmitted radiation in percentage.

kPa Soil resistance to penetration.

SWC Soil water content.

SM Exposed mineral soil.

litter Litter cover in percentage.

CWD Ocular estimation in the regeneration plot in percentage.

MT Microtopography. 1 plane, 2 convex, 3 concave, 4 mixed (convex and concave) in the regeneration plot.

S Ground-layer vascular species richness in the regeneration plot..

LLES Long-lived early-seral tree species (N. dombeyi , N. alpina , Nothofagus pumilio).

SLES Short-lived early-seral plants (Ribes spp. and Fuchsia sp).

LLLS Long-lived late-seral tree species (L. philippiana and Dasyphyllum diacantaoides).

log.bam Logarithm of the cover of bamboo (%) in the regeneration plot.

Source

The data were obtained from the DRYAD repository at doi: 10.5061/dryad.3q977

References

Soto D, Puettmann K.2018. Topsoil removal through scarification improves natural regeneration in high-graded Nothofagus old-growth forests. Journal Applied Ecology 55: 967- 976.

Examples

```
data(regNothofagus)
head(regNothofagus)
```

simula *Simulated yield of forestry plantations of exotic species in Chile.*

Description

The yield tables of simulated plantations of Pinus radiata, Eucalyptus globulus, and Eucalyptus nitens are obtained from the Radiata simulator and EucaSim simulator built in Chile. Several stand-level variables are part of the output.

Usage

```
data(simula)
```

Format

Contains stand-level variables, as follows:

species "P. radiata" is Pinus radiata, "E. globulus" is Eucalyptus globulus, and "E. nitens" is Eucalyptus nitens.

age plantation age, in years.

tph Tree density, in trees/ha.

gha Basal area, in m^2/ha.

toph Dominant height, in m.

qmd quadratic mean diameter, in cm.

totvol gross stand volume, in m^3/ha

viu.10 stand volume below an utilizacion index of 10 cm, in m^3/ha.

viu.15 stand volume below an utilizacion index of 15 cm, in m^3/ha.

viu.20 stand volume below an utilizacion index of 20 cm, in m^3/ha.

viu.25 stand volume below an utilizacion index of 25 cm, in m^3/ha.

Source

The data were obtained as outputs for plantations without management in Chile. The academic version of the simulator was used. You can visit mnssimulacion.cl

Examples

```
data(simula)
```

skew *Computes the skewness of a numeric vector*

Description

The skewness is about the departure from symmetry of a frequency distribution. Therefore, It is about asymmetry. One way to assess asymmetry of a random variable is to compute an statistics representing its skewness. The current function an dimensionless statistics of the skewness of given vector.

Usage

```
skew(x, na.rm = TRUE)
```

Arguments

x	A numeric vector representing a random variable.
na.rm	Logical value to remove NA values. The default is set to TRUE.

Details

The skewness of a random variable is the third moment of the standardized variable. There are several ways of parameterizing an skewness estimator, such as depending on the third moment and the standard deviation of the random variable.

Value

The value of the the skewness of given vector

Author(s)

Christian Salas-Eljatib.

Examples

```
y.var<-rnorm(100);x.var<-rbeta(100,.2,2)
skew(y.var)
skew(x.var)
```

`slashpine` *Biomass dataset*

Description

Dataset that contains nine pairs of columns with information about biomass of 40 samples.

Usage

```
data(slashpine)
```

Format

The data frame contains nine variables as follows:

tree_id tree code

dbh diameter

h heigth

lcl live crown lenght

age age tree

wood wood biomass

bark bark biomass

crown crown biomass

tree tree biomass

Source

Data were provided by Dr Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

References

Parresol BR. 2001. Additivity of nonlinear biomass equations. Canadian Journal of Forest Research, 31:865-878.

Examples

```
data(slashpine)
head(slashpine)
```

slashpine2 *Biomasa*

Description

Dataset que contiene nueve pares de columnas con informacion sobre la biomasa de 40 árboles.

Usage

```
data(slashpine2)
```

Format

Variables se describen a continuación:

tree_id Identifcador del árbol

dbh diámetro

h altura total

lcl largo de copa

age edad árbol

wood biomasa madera

bark biomasa corteza

crown biomasa copa

tree biomasa total

Source

Datos fueron contribuidos por el Dr Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

References

Parresol BR. 2001. Additivity of nonlinear biomass equations. Canadian Journal of Forest Research, 31:865-878.

Examples

```
data(slashpine2)
head(slashpine2)
```

sludge — *Sludge data are at different cities, with a value of concentration zinc.*

Description

Dataset contains 36 observations

Usage

```
data(sludge)
```

Format

Contains four variables, as follows:

city Name of city.

rate Concentration rate of sludge.

zinc Value of concentration (in ppm).

trt.comb Combination between city and rate factors.

Source

The data were provided from.. still remember.

References

not yet

Examples

```
data(sludge2)
table(sludge$city,sludge$rate)
levels(sludge$city)
tapply(sludge$zinc, list(sludge$city,sludge$rate), mean)
```

sludge2 — *Sludge data are at different cities, with a value of concentration zinc.*

Description

Datos de contenido de Zinc en el tratamiento de lodos

Usage

```
data(sludge2)
```

Format

Contiene las siguinetes cuatro variables:

ciudad Nombre de la ciudad.

tasa Tasa de concentracion de lodo.

zinc Concentracion de Zinc, en ppm.

trt.comb Identificador de la combinacion de niveles entre los factores ciudad y tasa.

Source

The data were provided from.. still remember.

References

not yet

Examples

```
data(sludge2)
table(sludge2$ciudad,sludge2$tasa)
levels(sludge2$ciudad)
tapply(sludge2$zinc, list(sludge2$ciudad,sludge2$tasa), mean)
```

---

snaspe *On the National System of State Protected Wild Areas (SNASPE) of Chile.*

Description

Units of the National System of State Protected Wild Areas (SNASPE).

Usage

```
data(snaspe)
```

Format

Contains the following variables:

unit.id Number for the unit.

unit Name of the protected area.

category Category of the unit. It can be either a National Park, a National Reserve or a Natural Monument.

county Name of the county where the unit is located.

province Province where the unit is located.

region Region where the unit is located.

perim.km Perimeter, in km.

area.ha Area, in hectares.

area.m2 Area, in m^2.

Source

These data are freely available at https://ide.minagri.gob.cl

References

The Chilean SNASPE is under the direction of the Chilean Forest Service (CONAF). Further information and documentation can be found at https://www.conaf.cl

Examples

```
data(snaspe)
head(snaspe)
table(snaspe$category)
tapply(snaspe$area.ha,snaspe$category,mean)
```

---

snaspe2 *Sistema nacional de areas protegidas del estado (SNASPE) de Chile*

Description

Contiene variables general de las unidades del sistema de areas protegidas por el estado de Chile (SNASPE).

Usage

```
data(snaspe2)
```

Format

Contiene las siguientes variables para cada unidad del SNASPE:

uni.id Número indentificador de la unidad.

unidad Nombre de la unidad.

categoria Categoría de la unidad. Puede ser Parque Nacional, Reserva Nacional, o Monumento Natural.

comuna Nombre de la communa donde esta la unidad.

province Nombre de la provincia donde esta la unidad.

region Nombre de la región.

perim.km Perimetro, en km.

area.ha Área, en hectareas.

area.m2 Área, en m^2.

Source

Estos datos fueron obtenidos desde https://ide.minagri.gob.cl

References

EL SNASPE esta bajo la administración de la Corporación Nacional Forestal (CONAF) de Chile. Mayor información se puede encontrar en https://www.conaf.cl

Examples

```
data(snaspe2)
head(snaspe2)
table(snaspe2$categoria)
tapply(snaspe2$area.ha,snaspe2$categoria,mean)
```

---

soiltreat *Soil treatment experiment in tree seedlings*

Description

A test was made of the effect of three soil treatments on the height growth of 2-year-old seedlings. Treatments were assigned at random to the three plots within each of 11 blocks. Each plot was made up of 50 seedlings. Average 5-year height growth was the criterion for evaluating treatments.

Usage

```
data(soiltreat)
```

Format

Contains the four following columns, at the plot-level,

block Block unit.

treat Treatment level.

ini.h Initial height, in m.

inc.h Increment in height during 5-year, in m.

Source

Table in page 71 of Freese (1967). The data were entered by Miss Nayeli Ramirez, a former student of Prof. Christian Salas-Eljatib.

References

- Freese, F 1967. Elementary statistical methods for foresters. Agriculture Handbook 3171, USDA Forest Service.

Examples

```
data(soiltreat)
head(soiltreat)
tapply(soiltreat$inc.h,soiltreat$treat,summary)
tapply(soiltreat$inc.h,soiltreat$treat,sd)
```

`soiltreat2` *Tratamientos del suelo en el crecimiento de plantulas.*

Description

Un experimento sobre el efecto de tres tratamientos del suelo en el crecimiento en altura de plantulas de 2-años de edad. Los tratamientos fueron asignados aleatoriamente a tres parcelas dentro de cada uno de 11 bloques. Cada parcela esta constituida por hasta 50 plantulas. El promedio del incremento en altura de los últimos 5 años fue la variable de interes para evaluar los tratamientos.

Usage

```
data(soiltreat2)
```

Format

Los datos, a nivel de parcela, tienen las siguientes columnas,

bloque Bloque del experimento.

tmo Factor tratamiento, medido en tres nivels.

alt.ini Altura initial, rn m.

alt.inc Incremento en altura durante los últimos cinco años, en m.

Source

Cuadro de la página 71 de Freese (1967). Los datos fueron digitados por la Srta. Nayeli Ramirez, una estudiante del Prof. Christian Salas-Eljatib.

References

- Freese, F 1967. Elementary statistical methods for foresters. Agriculture Handbook 3171, USDA Forest Service.

Examples

```
data(soiltreat2)
head(soiltreat2)
tapply(soiltreat2$alt.inc,soiltreat2$tmo,summary)
tapply(soiltreat2$alt.inc,soiltreat2$tmo,sd)
```

spataustria *Tree locations for several plots of Norway spruce in Austria*

Description

The Cartesian position, species, year, ID tree , and diameter of trees within a plot were measured.

Usage

```
data(spataustria)
```

Format

Contains cartesian position of trees, and covariates, in sample plots, as follows:

plot.code Plot identificator

tree.code Tree identificator

spp.name species abreviation as follows: PCAB=Picea abies, FASY= Fagus sylvatica, QCPE=Quercus petraea , PNSY= Pinus Sylvestris, LADC=Larix decidua

x.coord Cartesian position in the X-axis, in m

y.coord Cartesian position in the Y-axis, in m

year Measurement year

dbh diameter at breast-height, in cm

References

- Kindermann G. Kristofel F, Neumann M, Rossler G, Ledermann T & Schueler. 2018. 109 years of forest growth measurements from individual Norway spruce trees. Sci. Data 5:180077 doi: 10.1038/sdata.2018.77

Examples

```
data(spataustria)
head(spataustria)
pos<-spataustria
oldpar<-par(mar=c(4,4,0,0))
bord<-data.frame(
 x=c(min(pos$x.coord),max(pos$x.coord),min(pos$x.coord),max(pos$x.coord)),
 y=c(min(pos$y.coord),min(pos$y.coord),max(pos$y.coord),min(pos$y.coord))
 )
plot(bord,type="n", xlab="x (m)", ylab="y (m)", asp=1, bty='n')
points(pos$x.coord,pos$y.coord,col=pos$plot.code,cex=0.5)
par(oldpar)
```

species *Names and other information of plant species (mainly trees)*

Description

This data set provides names (taxonomy), of plant species. Includes codes and name abbreviations used by the Biometrics group at the Forest Biometrics and Modelling Lab, Universidad de Chile, Santiago, Chile.

Usage

```
data(species)
```

Format

A data frame with 63 observations on 31 variables

nesp Unique correlative specie number

spp.ci.name Species scientific name

spp.ci.abb Species scientific name abbreviation

common.name Species common name. No blank spaces, no special characters

common.nameBlank Species common name. With blank spaces, no special characters

esp Species code: code given by CEM Biometrics to identify species for different processing routines

common.nameLatex Species common name formatted for Latex

nTaxon Unique number of the taxon (i.e., species)

kingdom Taxonomic rank Kingdom. In this datase, all species belong to the Kingdom Plantae

division Taxonomic rank division or phylum within the Kingdom

class Taxonomic rank Class within the Kingdom

order Taxonomic rank Order within the Class

family Taxonomic rank Family within the Order

spp.ci.full Full scientific name including author

genus Taxonomic rank Genus within the Family

epithet Specific epithet

spp.aut Species author

subspp Subespecies: one of two or more populations of a species varying from one another by morphological characteristics

subspp.aut Subespecies author

varspp Species variety or varietas

varspp.aut Variety author

formspp Form or forma

formspp.aut Form author

commonNamesList List of common names per species, separated by commas

synonyms Synonyms of the scientific name by which the species has been or is known

borCountries Border countries given the species distribution range

habit Habit. The general appearance, growth form, or architecture e.g., tree, shrub, grass

lifeCycle Life cycle

statusOri Status according to the species origin: Native or Endemic

regDist Distribution range of the species, within Chile administrative regions

elev.range Distribution range of the species, in terms of elevation. Meters above sea level

notes Notes

Source

Data available at https://investigacion.conaf.cl, but modified by the Forest Biometrics and Modelling Laboratory at the Universidad de Chile.

References

Proyecto 004/2016 Lista sistematica actualizada de la flora vascular nativa de Chile, origen y distribucion geografica. VII Concurso del Fondo de Investigacion del Bosque Nativo.

Examples

```
data(species)
table(species$family)
```

`species2` *Información taxonómica de especies vegetales (principalmente árboles)*

Description

Los datos proveen diferentes características de la clasificación taxonómica de especies de plantas. Incluye codigos y otros que son especialmente usados en biometría de bosques.

Usage

```
data(species2)
```

Format

Los datos contienen31 variables (columnas)

nesp Unique correlative specie number

spp.ci.name Species scientific name

spp.ci.abb Species scientific name abbreviation

nom.com Species common name. No blank spaces, no special characters

nom.com.vacio Species common name. With blank spaces, no special characters

esp Species code: code given by CEM Biometrics to identify species for different processing routines

nom.com.latex Species common name formatted for Latex

ntaxon Unique number of the taxon (i.e., species)

reino Taxonomic rank Kingdom. In this datase, all species belong to the Kingdom Plantae

division Taxonomic rank division or phylum within the Kingdom

clase Taxonomic rank Class within the Kingdom

orden Taxonomic rank Order within the Class

familia Taxonomic rank Family within the Order

spp.ci.comple Full scientific name including author

genero Taxonomic rank Genus within the Family

epiteto Specific epithet

spp.aut Species author

subspp Subespecies: one of two or more populations of a species varying from one another by morphological characteristics

subspp.aut Subespecies author

varspp Species variety or varietas

varspp.aut Variety author

formaspp Forma de vida de la especie

formaspp.aut Autor que asigno la forma de vida

nomcom.list List of common names per species, separated by commas

sinonimia Sinonimia of the scientific name by which the species has been or is known

pais.limi Border countries given the species distribution range

habito Habit. The general appearance, growth form, or architecture e.g., tree, shrub, grass

ciclo.vida Life cycle

estatus.ori Status according to the species origin: Native or Endemic

dist.regional Distribution range of the species, within Chile administrative regions

rango.alti Rango altitudinal, en metros sobre el nivel del mar, de la especie.

notas Notas

Source

Datos disponibles en https://investigacion.conaf.cl, con ciertas modificaciones (no botanicas) por el Laboratorio de Biometría y Modelación Forestal de la Universidad de Chile.

References

Proyecto 004/2016 Lista sistematica actualizada de la flora vascular nativa de Chile, origen y distribucion geografica. VII Concurso del Fondo de Investigacion del Bosque Nativo.

Examples

```
data(species2)
table(species2$familia)
```

---

sppAbundance *Contains information of abundance of plant species in the central-southern Andes of Chile.*

Description

Abundance of plant species [50 total] (at parcel scale [100 m^2]) in burned Araucaria-Nothofagus forests with different levels of fire severity (ie, unburned = unburned, low_sev = low severity, mid_sev = medium severity , high_sev = high severity) in the China Muerta National Reserve, Andes of central-southern Chile.

Usage

```
data(sppAbundance)
```

Format

Contains 6 variables, as follows:

sp.name name of specie.

sp.code.name code of specie

unburned Abundance of plants unburned.

low.sev Abundance of plants for low severity of burned.

mid.sev Abundance of plants for middle severity of burned.

high.sev Abundance of plants for high severity of burned.

Source

The data are provided courtesy of Dr Andres Fuentes-Ramirez at the Universidad de La Frontera (Temuco, Chile)

References

- Fuentes-Ramirez A, Salas-Eljatib C, Gonzalez M, Urrutia J, Arroyo P, Santibanez P. 2020. Initial response of understorey vegetation and tree regeneration to a mixed-severity fire in old-growth Araucaria-Nothofagus forests. Applied Vegetation Science. 23:210-222.

Examples

```
data(sppAbundance)
head(sppAbundance)
```

`sppTraits` *Contains information of functional traits of species.*

Description

Dataset contains 48 observations about about functional trait values for each of the 48 study species, including 23 evergreen and 25 deciduous.

Usage

```
data(sppTraits)
```

Format

Contains 17 variables, as follows:

sp Abbreviated name of specie.

sp.name Name of specie.

family Family of specie.

genus Genus of specie.

phyl Type of phylogeny.

l.hab Type of leaf habit.

leaf Type of leaf.

lt .

lma Leaf mass area.

amass Photosynthetic capacity per unit leaf mass.

n.mass Leaf N content per unit mass.

pmass Leaf P content per unit mass.

l.lifespan Leaf life span.

l.length Leaf length.

sem Seed mass.

wd Wood density.

max.h Maximum height.

Source

The data were provided from DRYAD repository

References

- Ameztegui A, Paquette A, Shipley B, Heym M, Messier C, Gravel D. 2016. Shade tolerance and the functional trait: demography relationship in temperate and boreal forests. Functional Ecology 31: 821-830.

Examples

```
data(sppTraits)
head(sppTraits)
```

---

standLleuque *Plot-level data with variables from Andean Prumnopitys forests*

Description

Data on density, basal area, mean square diameter and other variables of 24 plots for Lleuque is provided.

Usage

```
data(standLleuque)
```

Format

The data frame contains seven variables as follows:

rodal number of stand

plot.id code of plot

nha Density of plot

gha Basal area of plot

qmd Quadratic mean diameter of plot

toph Dominant height of plot

structure Forest structure level: open, secondary adult, pure

Source

The data are provided courtesy of Prof. Rodrigo Vargas-Gaete at Universidad de La Frontera (Temuco, Chile).

References

Vargas-Gaete R, Salas-Eljatib C, Penneckamp D, Neira Z, Diez MC, Vargas-Picón, R. 2020. Estructura y regeneración de bosques de Prumnopitys andina en los Andes del sur de Chile. Gayana Botánica 77(1):48-58. doi: 10.4067/S0717664320200000100048

Examples

```
data(standLleuque)
head(standLleuque)
```

`standLleuque2` *Datos con variables a nivel de parcela de bosques de Prumnopitys andina*

Description

Se proporciona informacion de densidad, area basal, diámetro medio cuadratico y otras variables de 24 parcelas para Lleuque.

Usage

```
data(standLleuque2)
```

Format

Variables se describen a continuacion::

rodal Número de rodal.

plot.id Codigo de parcela.

nha Densidad de parcela, en arb/ha.

gha Area basal de parcela, en m^2/ha..

qmd Diámetro del árbol de área basal media, en cm.

toph Altura dominante, en m.

estructura Factor representando a la estructura del bosque, en tres niveles: Abierto, secundario adulto o puro

Source

Los datos fueron cedidos por el Prof. Rodrigo Vargas-Gaete de la Universidad de La Frontera (Temuco, Chile).

References

Vargas-Gaete R, Salas-Eljatib C, Penneckamp D, Neira Z, Diez MC, Vargas-Picón, R. 2020. Estructura y regeneración de bosques de *Prumnopitys andina* en los Andes del sur de Chile. Gayana Botánica 77(1):48-58. doi: 10.4067/S0717664320200000100048

Examples

```
data(standLleuque2)
head(standLleuque2)
table(standLleuque2$rodal,standLleuque2$plot)
```

`timeserplot` *Produces a time series plot*

Description

Produces a time series plot, of variable 'y' as a function of 'x' by an observational unit factor.

Usage

```
timeserplot(
  data = data,
  y = y,
  x = x,
  obs.unit = obs.unit,
  factor1 = NA,
  factor2 = NA,
  only.lines = FALSE,
  ylab = NA,
  xlab = NA,
  linetype.lab = NA,
  factor2.line = TRUE,
  factor2.col = FALSE,
  col.lines = "black",
  max.y.all = NA,
  levels.i.want = FALSE,
  col.lev.i.want = FALSE
)
```

Arguments

`data`	a dataframe with at least tree columns representing the response variable ("y"), the main predictor variable ("x"), and a variable indicating the observational unit ("obs.unit").
`y`	a character giving the column name of the response variable or variable of interest.
`x`	a character giving the column name of the main predictor variable. Generally this variable is time.
`obs.unit`	a character giving the column name containing the info of the observational unit.
`factor1`	an optional character having the name of a column having a factor variable (e.g., treatment). The detault value is set to NULL.

factor2	an optional character having the name of a column having another factor variable (e.g., species). The detault value is set to NULL.
only.lines	a logic value if only lines, but not including dots, are going to be drwan in the plot. The detault value is set to FALSE.
ylab	Label for the Y-axis
xlab	Label for the X-axis
linetype.lab	is an optional string to be used as the title of the factor being represented by lines. It is only needed if factor1 and factor2 are defined. See example.
factor2.line	a logic value if the second factor, factor2, is going to be segregated according to the type of lines. The detault value is set to TRUE.
factor2.col	a logic value if the second factor, factor2, is going to be segregated according to the color of the lines only. The detault value is set to FALSE.
col.lines	A string specifying the single color to be used for the lines of the timeseries
max.y.all	A number representing the maximum level of Y-axis for all classes
levels.i.want	A vector having the levels for the factor under study
col.lev.i.want	A vector having the colors to be used for the factor under study

Details

Both 'y' and 'x' must be numeric variables, and the column representing the observational unit, must be a factor. This factor identifies the longitudinal context of the data, for instance, a student being measured on time. Besides, two more factors can be added to the plotting details, in order to represent the potential variability among them.

Value

This function returns a time series plot

Note

Please, uses the function with caution, and run first the examples to understand it better.

Author(s)

Christian Salas-Eljatib

References

Salas-Eljatib, C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor, Santiago, Chile. 170 p. https://eljatib.com/rlibro

Examples

```
data(ficdiamgr, package="datana")
df <- ficdiamgr
head(df)
str(df)
df$site<-as.factor(df$site)
df$species<-as.factor(df$species)
table(df$tree,df$species)
table(df$species,df$site)
#
timeserplot(df, y="dbh", x="time", obs.unit = "tree")
timeserplot(df, y="dbh", x="time", obs.unit = "tree", only.lines = TRUE)
#
## Otros ejemplos de uso de la funcion
timeserplot(df, y="dbh", x="time", obs.unit = "tree", col.lines = "blue",
only.lines = TRUE)
timeserplot(df, y="dbh", x="time", obs.unit = "tree", only.lines = FALSE)
#
timeserplot(df, y="dbh", x="time", obs.unit = "tree", factor1="site")
timeserplot(df, y="dbh", x="time", obs.unit = "tree", factor1="site",
factor2= "species")
timeserplot(df, y="dbh", x="time", obs.unit = "tree", factor1="site",
 factor2= "species", factor2.col = TRUE, only.lines = TRUE)
```

---

traits *Functional traits of vegetative species in Chile.*

Description

Functional traits of vegetative species in Chile. Includes column with codified name (esp)

Usage

```
data(traits)
```

Format

esp species codified name

shadeTolerance indicates the species tolerance to shape. There are three main classes: shade-tolerant, shade-midtolerant and shade-intolerant

spp.ci.name Scientific name.

spp.ci.abb. .

wd wood density in kg per cubic meters.

Source

Some of the information on shade tolerance can be found in Soto et al 2010.

References

- Soto DP, Salas C, Donoso PJ, Uteau D. 2010. Heterogeneidad estructural y espacial de un bosque mixto dominado por Nothofagus dombeyi despues de un disturbio parcial. Revista Chilena de Historia Natural 83(3): 335-347.

`traits2` *Rasgos funcionales para algunas especies vegetales de Chile.*

Description

Rasgos funcionales para algunas especies vegetales de Chile.

Usage

```
data(traits2)
```

Format

especie Codigo alfanumerico para especie.

tolerancia.sombra Tolerancia a la sombra de la especie.

nombre.cient Nombre cientifico.

nom.cient.abre Nombre cientifico abreviado.

den.madera Densidad de la madera en kg/m^3.

Source

Parte de la informacion sobre tolerancia a la sombra se encuentra en Soto et al 2010

References

- Soto DP, Salas C, Donoso PJ, Uteau D. 2010. Heterogeneidad estructural y espacial de un bosque mixto dominado por Nothofagus dombeyi despues de un disturbio parcial. Revista Chilena de Historia Natural 83(3): 335-347.

`treegr` *Diameter and height growth of Grand-fir (Abies grandis) sample trees*

Description

Diameter and height growth of 66 Grand-fir trees. Data derived from stem analysis sample trees collected by Dr Albert Stage (US Forest Service, Moscow, ID, USA.)

Usage

```
data(treegr)
```

Format

Contains seven column, as follows:

tree.id Tree number identificator. An unique number to each sample tree.

forest Forest type.

habitat Forest habitat type.

tree.code A composite tree code representing the following columns: tree.id-forest-habitat

age Age, in yr

dbh Diameter at breast-height, in cm.

toth Total height, in m.

Source

Originally, the data were provided by Dr Albert Stage (R.I.P) to Professor Andrew Robinson (University of Idaho, USA), whom used them to explain the fitting of statistical models. Dr Christian Salas-Eljatib was a former graduate student of Statistics of Prof Robinson at the University of Idaho.

References

Stage, A. R., 1963. A mathematical approach to polymorphic site index curves for Grand fir. Forest Science 9 (2), 167–180.

Examples

```
data(treegr)
head(treegr)
```

treegr2 *Crecimiento en diámetro y altura de árboles muestras de Grand-fir (Abies grandis)*

Description

Crecimiento en diámetro y altura de 66 árboles de Grand-fir. Los datos fueron derivados a partir de árboles muestras de analisis fustal colectados por el Dr Albert Stage (US Forest Service, Moscow, ID, USA.)

Usage

```
data(treegr2)
```

Format

Contiene las siguientes siete columnas:

num.arb Número identificador del árbol. Unico para cada árbol muestra.

bosque Tipo forestal.

habitat Clasificación de tipo de habitat.

cod.arb Un código que combina a las siguientes columnas: num.arb-bosque-habitat

edad Edad, en años.

dap Diámetro a la altura del pecho, en cm. Note que los decimales es debido a que esta variable originalmente fue medida en pulgadas.

atot Altura total, in m. Note que los decimales es debido a que esta variable fue originalmente medida en pies.

Source

Originalmente los datos fueron cedidos por el Dr Albert Stage (Q.E.P.D) al Profesor Andrew Robinson (University of Idaho, USA), quien los usaba para explicar el ajuste de modelos estadísticos. El Dr Christian Salas-Eljatib fue un estudiante de postgrado en estadística del Prof. Robinson en la Univ. of Idaho.

References

Stage AR. 1963. A mathematical approach to polymorphic site index curves for Grand fir. Forest Science 9(2):167–180.

Examples

```
data(treegr2)
head(treegr2)
```

`treelistinve` *Tree-list data from a forest sampling work (usually term as a forest inventory).*

Description

Tree-level variables measured within three sample plots in a forest sampling effort. This sort of work is commonly referred as a forest inventory. Notice that plots might have different areas. The sampling was carried out in a secondary forest of Nothofagus obliqua in the Rucamanque experimental station, near the city of Temuco, in southern Chile.

Usage

```
data(treelistinve)
```

Format

Contains tree-level variables, as follows:

plot Plot number.

plot.size Plot size, in m^2.

tree Tree identificator

species species common name as follows: Olivillo= Aextocicon puncatatum, Tepa= Laureliopsis philippiana, Lingue= Persea lingue, Coigue=Nothofagus dombeyi, Roble=Nothofagus obliqua, Other=Other

dbh Diameter at breast-height, in cm.

toth Total height, in m. Only measured for some sample trees.

Source

The data are provided courtesy of Prof. Christian Salas-Eljatib (Universidad de Chile, Santiago, Chile).

References

- Salas C. 2001. Caracterización básica del relicto de Biodiversidad Rucamanque. Bosque Nativo, 29:3-9. https://eljatib.com/publication/2001-06-01_caracterizacion_basi/

- Salas C. 2002. Ajuste y validación de ecuaciones de volumen para un relicto del bosque de Roble-Laurel-Lingue. Bosque 23(2): 81-92. doi: 10.4067/S07179200200200020009 https://eljatib.com/publication/2002-07-01_ajuste_y_validacion_/

Examples

```
data(treelistinve)
head(treelistinve)
tapply(treelistinve$dbh,treelistinve$species,summary)
```

`treelistinve2` *Lista de árboles en un muestreo forestal (usualmente llamado inventario forestal).*

Description

Variables a nivel de árbol medidas en tres unidades de muestreo (i.e., parcelas) establecidas en un muestreo forestal. Este tipo de muestreo de bosques, es comunmente conocido como "inventario forestal". Note que las parcelas podrían tener diferentes superficies. El muestreo fue realizado en un bosque secundario dominado por Nothofagus obliqua en el predio Rucamanque, en las cercanías de la ciudad de Temuco, en el sur de Chile.

Usage

```
data(treelistinve2)
```

Format

Contiene variables a nivel de árbol dentro de parcelas.

parce Número de la parcela de muestreo.

sup.parce Superficie de la parcela, en m^2.

arbol Número identificador del árbol.

spp Nombre comun de especies como sigue: Olivillo= Aextocicon puncatatum, Tepa= Laureliopsis philippiana, Lingue= Persea lingue, Coigue=Nothofagus dombeyi, Roble=Nothofagus obliqua, Other=Other

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m. Solo medida en algunas árboles muestra.

Source

Los datos fueron cedidos por el Prof. Christian Salas-Eljatib, Universidad de Chile (Santiago, Chile).

References

- Salas C. 2001. Caracterización básica del relicto de Biodiversidad Rucamanque. Bosque Nativo, 29:3-9. https://eljatib.com/publication/2001-06-01_caracterizacion_basi/

- Salas C. 2002. Ajuste y validación de ecuaciones de volumen para un relicto del bosque de Roble-Laurel-Lingue. Bosque 23(2): 81-92. doi: 10.4067/S07179200200200020009 https://eljatib.com/publication/2002-07-01_ajuste_y_validacion_/

Examples

```
data(treelistinve2)
unique(treelistinve2$parce)
table(treelistinve2$parce,treelistinve2$sup.parce)
tapply(treelistinve2$dap,treelistinve2$spp,summary)
```

treevol *Diameter, height and volume for Black Cherry Trees*

Description

This data set provides measurements of the diameter, height and volume of timber in 31 felled black cherry trees. The records are a slight modification to the original dataframe "trees" from the $datasets$ R package.

Usage

```
data(treevol)
```

Format

A data frame with 31 observations and three variables

dbh Diameter at breast height, in cm.

toth Total height, in m.

vtot Timber volume, in cubic meters.

Source

Ryan TA, Joiner BL, and Ryan BF. 1976. The Minitab Student Handbook. Duxbury Press.

Examples

```
pairs(treevol, panel = panel.smooth, main = "treevol dataframe")
plot(vtot ~ dbh, data = treevol, log = "xy")
coplot(log(vtot) ~ log(dbh) | toth, data = treevol,
       panel = panel.smooth)
summary(m1 <- lm(log(vtot) ~ log(dbh), data = treevol))
summary(m2 <- update(m1, ~ . + log(toth), data = treevol))
anova(m1,m2)
```

treevol2 *Volumen, altura, y diámetro para árboles de Black Cherry*

Description

Estos datos provienen de mediciones de volumen, altura y diámetro en 31 árboles volteados de black cherry (Prunus serotina). Son una modificacion la dataframe 'trees' del paquete datasets de R.

Usage

```
data(treevol2)
```

Format

Datos con 31 observaciones y tres variables

dap diámetro a la altura del pecho, en cm

atot altural total, en m

vtot volumen total, en m^3

Source

Ryan, T. A., Joiner, B. L. and Ryan, B. F. (1976) The Minitab Student Handbook. Duxbury Press.

Examples

```
pairs(treevol2, panel = panel.smooth, main = "treevol dataframe")
plot(vtot ~ dap, data = treevol2, log = "xy")
coplot(log(vtot) ~ log(dap) | atot, data = treevol2,
       panel = panel.smooth)
summary(m1 <- lm(log(vtot) ~ log(dap), data = treevol2))
summary(m2 <- update(m1, ~ . + log(atot), data = treevol2))
anova(m1,m2)
```

---

treevolroble *Tree volume of roble (Nothofagus obliqua) in the Rucamanque forest*

Description

These are tree-level measurement data of sample trees in the Rucamanque experimental forest, near Temuco, in the Araucania region in south-central Chile, measured in 1999. The data are the same as in the dataframe "treevolruca", but only having observations for the species Nothofagus obliqua (roble).

Usage

```
data(treevolroble)
```

Format

Contains tree-level variables, as follows:

tree.no Tree id

dbh Diameter at breast height, in cm

toth Total height, in m.

d6 Upper-stem diameter at 6 m, in cm

totv Tree gross volume, in m^3 with bark.

Source

The data are provided courtesy of Dr Christian Salas at the Universidad de Chile (Santiago, Chile).

References

- Salas C. 2002. Ajuste y validación de ecuaciones de volumen para un relicto del bosque de Roble-Laurel-Lingue. Bosque 23(2): 81-92. doi: 10.4067/S07179200200200020009 https://eljatib.com/publication/2002-07-01_ajuste_y_validacion_/

Examples

```
data(treevolroble)
head(treevolroble)
```

`treevolroble2` *Volumen a nivel de árbol para roble (Nothofagus obliqua) especie en el bosque de Rucamanque*

Description

Volumen, altura y diámetro, entre otras para árboles muestra de Nothofagus obliqua (roble) en el bosque de Rucamanque, cerca de Temuco, en la región de la Araucania, en el sur de Chile.

Usage

```
data(treevolroble2)
```

Format

Las siguientes columnas son parte de la dataframe:

arbol Número del árbol.

especie Especie.

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m.

d6 Diámetro fustal a los 6 m, en cm.

vtot Volumen bruto total, en m^3 with bark.

Source

Los datos son proporcionados por el Prof. Christian Salas (Universidad de Chile).

References

- Salas C. 2002. Ajuste y validación de ecuaciones de volumen para un relicto del bosque de Roble-Laurel-Lingue. Bosque 23(2): 81-92. doi: 10.4067/S07179200200200020009 https://eljatib.com/publication/2002-07-01_ajuste_y_validacion_/

Examples

```
data(treevolroble2)
head(treevolroble2)
```

`treevolruca` *Tree volume by species in the Rucamanque forest*

Description

These are tree-level measurement data of sample trees in the Rucamanque experimental forest, near Temuco, in the Araucania region in south-centralChile, measured in 1999. The following species are part of the data: laurel (laurelia sempervirens), lingue (Persea lingue), olivillo (Aextocicon puncatum), roble (Nothofagus obliqua), tepa (Laureliosis philippiana), y tineo (Weinmannia trichosperma).

Usage

```
data(treevolruca)
```

Format

Contains tree-level variables, as follows:

tree.no Tree id.

spp Species.

dbh Diameter at breast height, in cm.

toth Total height, in m.

d6 Upper-stem diameter at 6 m, in cm.

totv Tree gross volume, in m^3 with bark.

Source

The data were provided courtesy of Dr Christian Salas (Universidad de Chile, Santiago, Chile).

References

- Salas C. 2002. Ajuste y validación de ecuaciones de volumen para un relicto del bosque de Roble-Laurel-Lingue. Bosque 23(2): 81-92. doi: 10.4067/S07179200200200020009 https://eljatib.com/publication/2002-07-01_ajuste_y_validacion_/

Examples

```
data(treevolruca)
head(treevolruca)
table(treevolruca$spp)
```

`treevolruca2` *Volumen a nivel de árbol en el bosque de Rucamanque*

Description

Volumen, altura y diámetro, entre otras para árboles muestra en el bosque de Rucamanque, cerca de Temuco, en la region de la Araucanía, en el sur de Chile. Las siguientes especies son parte de los datos: laurel (laurelia sempervirens), lingue (Persea lingue), olivillo (Aextocicon puncatum), roble (Nothofagus obliqua), tepa (Laureliosis philippiana), y tineo (Weinmannia trichosperma).

Usage

```
data(treevolruca2)
```

Format

Las siguientes columnas son parte de la dataframe:

arbol Número del árbol.

especie Especie.

dap Diámetro a la altura del pecho, en cm.

atot Altura total, en m.

d6 Diámetro fustal a los 6 m, en cm.

vtot Volumen bruto total, en m^3 with bark.

Source

Los datos fueron cedidos por el Dr Christian Salas-Eljatib (Chile).

References

- Salas C. 2002. Ajuste y validación de ecuaciones de volumen para un relicto del bosque de Roble-Laurel-Lingue. Bosque 23(2): 81-92. doi: 10.4067/S07179200200200020009 https://eljatib.com/publication/2002-07-01_ajuste_y_validacion_/

Examples

```
data(treevolruca2)
head(treevolruca2)
table(treevolruca2$especie)
```

xyboxplot *Creates a scatterplot with superposing boxplots*

Description

The function creates a scatterplot with superposing boxplots for the Y-axis variable. To a simple scatterplot between the response variable 'y' and the predictor variable 'x', this function superposes boxplots of the response by groups of the predictor variable. The main aim of the above described graph is to get a sense of the distribution of the response variable depending upon the predictor variable.

Usage

```
xyboxplot(x = x, y = y, col.dots = "blue", xlab = NULL, ylab = NULL)
```

Arguments

x	A numeric vector representing the time variable (X-axis).
y	A numeric vector representing the response variable (Y-axis).
col.dots	(optional) A string specifying the dot colors. Default is "blue".
xlab	(optional) A string specifying X-axis label.
ylab	(optional) A string specifying Y-axis label.

Details

Notice that the superposing boxplots for the Y-axis variable are computed by grouping the X-axis variable in 10 classes. Those classes are set by computing the ten percentiles of the X-axis variable, therefore each group has the same number of observations.

Value

The function returns the above described graph.

Author(s)

Christian Salas-Eljatib

References

- Salas-Eljatib C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor. Santiago, Chile. 170 p. https://eljatib.com

- Salas C, Stage AR, and Robinson AP. 2008. Modeling effects of overstory density and competing vegetation on tree height growth. Forest Science 54(1):107-122. doi: 10.1093/forestscience/54.1.107

Examples

```
data(fishgrowth)
df <- fishgrowth
xyboxplot(x=df$age,y=df$length)
xyboxplot(x=df$age,y=df$length)
```

`xyhist` *A scatterplot with marginal histograms*

Description

The function produces a scatterplot between the 'y'-axis variable and the 'x'-axis variable, but also adding the marginal histograms for both variables.

Usage

```
xyhist(
  x = x,
  y = y,
  col.x = "blue",
  col.y = "red",
  xlab = NULL,
  ylab = NULL,
  x.lim = NULL,
  y.lim = NULL
)
```

Arguments

`x`	A numeric vector representing the X-axis variable
`y`	A numeric vector representing the Y-axis variable
`col.x`	(optional) A string specifying the color of the histogram of the X-variable. Default is "blue".
`col.y`	(optional) A string specifying the color of the histogram of the Y-variable. Default is "red".
`xlab`	(optional) A string specifying X-axis label. Default is "xvar".
`ylab`	(optional) A string specifying Y-axis label. Default is "yvar".
`x.lim`	(optional) A vector of two elements with the limits of the Y-axis. Default is the range of the X-variable.
`y.lim`	(optional) A vector of two elements with the limits of the Y-axis. Default is the range of the Y-variable.

Details

Both the response variable (Y-axis) and the predictor variable (X-axis) must be numeric.

Value

The function returns the above described graph.

Author(s)

Christian Salas-Eljatib

References

- Salas-Eljatib C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor. Santiago, Chile. https://eljatib.com

Examples

```
data(treevolroble)
df <- treevolroble
head(df)
xyhist(x=df$dbh,y=df$toth)
xyhist(x=df$dbh,y=df$toth, xlab="Variable X",  ylab="Variable Y")
xyhist(x=df$dbh,y=df$toth, xlab="Variable X", ylab="Variable Y",
  col.x = "gray",col.y="white")
```

---

xymultiplot *Figure of a matrix of scatterplots and histograms for several variables.*

Description

The function produces a panel of multiple scatterplots and histograms, showing the correlation coefficient among all pairs of variables. Notice that the data must contain only numeric variables.

Usage

```
xymultiplot(
  x,
  smooth = TRUE,
  scale = FALSE,
  density = TRUE,
  digits = 2,
  method = "pearson",
  pch = 20,
  lm = FALSE,
  cor = TRUE,
  jiggle = FALSE,
  factor = 2,
  col.hist = "cyan",
  col.densi.curve = "black",
  show.points = TRUE,
  col.points = "gray",
```

```
  smoother = FALSE,
  col.smooth = "red",
  ellipses = FALSE,
  col.ellip = "blue",
  col.cent.point = "green",
  rug = TRUE,
  breaks = "Sturges",
  cex.cor = 1,
  ci = FALSE,
  alpha = 0.05,
  ...
)
```

Arguments

x	is a dataframe containing all the numeric variables to be used for drawing the panel plot
smooth	a logical value for drawing smooth curves. The default is set to TRUE.
scale	scales the correlation font by the size of the absolute correlation. The default is set to FALSE.
density	a logical value for drawing a density curve. The default is set to TRUE.
digits	an optional numeric value for the digits to be used for drawing the correlation coefficient in the panel. Defaults is set to 2.
method	a string giving the method to be used for computing the correlation coefficient. Default is set to "pearson".
pch	The plot character (The default is 20, which looks like '.').
lm	Plot the linear fit rather than the LOESS smoothed fits. The default is FALSE.
cor	If plotting regressions, should correlations be reported? The default is TRUE.
jiggle	Should the points be jittered before plotting? The default is FALSE.
factor	factor for jittering (1-5), therefore only needed if "jiggle" is set to TRUE.
col.hist	a string giving the color to be used for the histograms of the panel. Default is set to "cyan".
col.densi.curve	a string with the name of the color to be used for the density curve. The default is set to "black".
show.points	a logical value for drawing the points in the scatter-plots. Defauls is set to TRUE.
col.points	a string giving the color to be used for the data points. Default is set to "gray".
smoother	If TRUE, then smooth.scatter the data points-slow but pretty with lots of subjects
col.smooth	a string giving the color to be used for the smoothed curve of the scatterplot. Default is set to "red".
ellipses	an optional logical value for drawing an ellipse for the scatter-plots. The default is set to FALSE.
col.ellip	a string giving the color to be used for the ellipse of the scatterplot. The default is set to "blue".

col.cent.point	a string giving the color to be used for the centroid point of the ellipse of the scatterplot. The default is set to "blue".
rug	a logical value for drawing the rugs in the histograms. Defauls is set to TRUE.
breaks	a string giving the method to be used for obtaining the breaks of the histogram. Defauls is set to "Sturges".
cex.cor	If this is specified, this will change the size of the text in the correlations. this allows one to also change the size of the points in the plot by specifying the normal cex values. If just specifying cex, it will change the character size, if cex.cor is specified, then cex will function to change the point size.
ci	Draw confidence intervals for the linear model or for the loess fit, defaults to ci=FALSE. If confidence intervals are not drawn, the fitting function is lowess.
alpha	an optional numeric value for the significance level. Defauls is set to 0.05.
...	other graphical parameters (see par and section 'Details' below).

Details

Generates a multipanel (matrix) of scatterplots and histograms to explore potential relationships among variables.

Value

This function returns a multipanel of scatterplots and histograms

Author(s)

A modification of Christian Salas-Eljatib of the function pairs.panels of the package *psych*.

References

- Salas-Eljatib C. 2021. Análisis de datos con el programa estadístico R: una introducción aplicada. Ediciones Universidad Mayor. Santiago, Chile. https://eljatib.com

Examples

```
##First example
data(bears2)
head(bears2)
df <- bears2[,c('peso','edad','cabezaL','cabezaA','largo','pechoP')]
descstat(df)
xymultiplot(df)
xymultiplot(df,ellipse=TRUE)
xymultiplot(df,ellipses=TRUE,col.cent.point = "yellow",
 col.densi.curve = "dark green",col.hist = "white")
```

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