Package ‘DanielBiostatistics10th’

September 16, 2022

Type Package

Title Functions for Wayne W. Daniel's Biostatistics, Tenth Edition

Version 0.1.8

Date 2022-09-14

Author Tingting Zhan [aut, cre, cph] (<https://orcid.org/0000-0001-9971-4844>)

Maintainer Tingting Zhan <tingtingzhan@gmail.com>

Description Functions to accompany Wayne W. Daniel's Biostatistics: A Foundation for Analysis in the Health Sciences, Tenth Edition.

License GPL-2

Encoding UTF-8

Depends R (>= 4.2), ggplot2

Imports e1071, ggrepel, latex2exp, methods, pracma, scales

Suggests car, DescTools

Language en-US

LazyData true

LazyDataCompression xz

RoxygenNote 7.2.1

NeedsCompilation no

Repository CRAN

Date/Publication 2022-09-16 11:06:14 UTC

R topics documented:

DanielBiostatistics10th-package *Functions for Wayne W. Daniel's* Biostatistics *(Tenth Edition)*

Description

Functions and examples to accompany Wayne W. Daniel's *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition, Wiley, ISBN: 978-1-119-62550-6.

https://www.wiley.com/en-us/Biostatistics:+A+Foundation+for+Analysis+in+the+Health+Sciences,+10th+Edition-p-9781119625506

Data sets from 10th edition https://bcs.wiley.com/he-bcs/Books?action=resource&bcsId=7849&itemId=1118302796&resourceId=30373.

Resources from 11th edition https://bcs.wiley.com/he-bcs/Books?action=index&bcsId=11491&itemId=1119496578, with errata of data.

---

binom2pois *Binomial Approaching Poisson*

Description

Binomial Approaching Poisson

Usage

```
binom2pois(x, lambda, size = c(10L, 100L))
```

Arguments

x	integer scalar, observed number of responses
lambda	positive numeric scalar, parameter λ of Poisson distribution
size	integer vector, parameter n of binomial distribution

Details

binom2pois shows how binomial density approaches Poisson density when $n \to \infty$ and $p \to 0$, while holding a constant product $np = \lambda$.

Value

binom2pois returns a binom2pois object, for which a print method, an autolayer and an autoplot method are defined.

See Also

dbinom dpois

Examples

```
binom2pois(x = 4L, lambda = 6, size = seq.int(10L, 50L, by = 10L))
```

BooleanRisk-class *Boolean Risk-&-Disease Table*

Description

Boolean Risk-&-Disease Table

Slots

.Data two-by-two integer matrix, contingency table of a Boolean test-&-disease decisions with layout

	Disease $(+)$	Disease $(-)$
Risk Factor $(+)$	x_{++}	x_{+-}
Risk Factor $(-)$	x_{-+}	x_{--}

BooleanTest-class *Boolean Test-&-Disease Table*

Description

Boolean Test-&-Disease Table

Slots

.Data two-by-two integer matrix, contingency table of a Boolean test-&-disease decisions with layout

	Disease $(+)$	Disease $(-)$
Test $(+)$	x_{++}	x_{+-}
Test $(-)$	x_{-+}	x_{--}

Chapter01 *Chapter 1*

Description

Functions and examples for Chapter 1, *Introduction to Biostatistics*.

Usage

```
sampleRow(x, size, replace = FALSE, prob = NULL)
```

Arguments

`x`	a data.frame
`size`	positive integer scalar, number of rows to be selected
`replace`	logical scalar, whether sampling should be with replacement (default `FALSE`)
`prob`	numeric vector of probability weights for each row of input `x` being sampled. Default `NULL` indicates simple random sampling

Value

sampleRow returns a data.frame, a simple random sample from the input.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

sample.int

Examples

```
library(DanielBiostatistics10th)
# To run a line of code, use shortcut
# Command + Enter: Mac and RStudio Cloud
# Control + Enter: Windows, Mac and RStudio Cloud
# To clear the console
# Control + L: Mac and RStudio Cloud

# Page 8, Example 1.4.1
class(EXA_C01_S04_01) # `EXA_C01_S04_01` is a 'data.frame' (a specific class defined in R)
dim(EXA_C01_S04_01) # dimension, number-row and number-column
head(EXA_C01_S04_01, n = 8L) # first `n` rows of a 'data.frame'
names(EXA_C01_S04_01) # column names of a 'data.frame'
EXA_C01_S04_01$AGE # use `$` to obtain one column from a 'data.frame'
sampleRow(EXA_C01_S04_01, size = 10L, replace = FALSE) # to answer Example 1.4.1

# Page 11, Example 1.4.2
EXA_C01_S04_01[seq.int(from = 4L, to = 166L, by = 18L), ]
```

`Chapter02` *Chapter 2*

Description

Functions and examples for Chapter 2, *Descriptive Statistics*.

Usage

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

print_freqs(x, breaks, include.lowest = TRUE, right = TRUE)
```

Arguments

`x`	numeric vector, the observations. In print_freqs function, this argument can also be a factor
`na.rm`	logical scalar, whether to remove the missing observations (default `TRUE`)
`breaks`	numeric vector, see cut.default
`include.lowest`	logical scalar, default `TRUE`. See cut.default
`right`	logical scalar, see cut.default

Details

print_freqs prints the (relative) frequencies and cumulative (relative) frequencies, from a numeric input vector, specified interval breaks as well as open/close status of the ends of the intervals.

print_stats prints the simple statistics of the input observations, such as sample size, mean, median, (smallest) mode, variance, standard deviation, coefficient of variation (if all observations are non-negative), quartiles, inter-quartile range (IQR), range, skewness and kurtosis. A histogram is also printed.

Value

print_freqs returns a freqs object, for which a show method, an autolayer and an autoplot method are defined.

print_stats does not have a returned value.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

cut.default table cumsum mean.default median.default Mode var sd quantile skewness kurtosis

Examples

```
library(DanielBiostatistics10th)

# Page 20, Example 2.2.1
head(EXA_C01_S04_01)
class(EXA_C01_S04_01$AGE) # 'integer'
class(age <- as.numeric(EXA_C01_S04_01$AGE)) # 'numeric'
sort(age) # Page 21, Table 2.2.1 # 'ordered vector'

# Page 23, Example 2.3.1
(ageB = seq.int(from = 30, to = 90, by = 10))
(r231 = print_freqs(age, breaks = ageB, right = FALSE)) # Page 25, Table 2.3.2
# The open/close of interval ends is determined by textbook using 30-39, 40-49, etc.
autoplot(r231, title = 'Page 27, Figure 2.3.2')

# Page 38-42, Example 2.4.1 - Example 2.4.6
# Page 44-46, Example 2.5.1 - Example 2.5.3
print_stats(age) # or some other data input

# Page 49, Example 2.5.4 (omitted)

# Page 50, Example 2.5.5
head(EXA_C02_S05_05)
boxplot(EXA_C02_S05_05$GRF, main = c('GRF from Page 50, Example 2.5.5'))
print_stats(EXA_C02_S05_05$GRF)
print_freqs(EXA_C02_S05_05$GRF, breaks = seq.int(10, 45, by = 5))
```

Chapter03 *Chapter 3*

Description

Functions for Chapter 3, *Some Basic Probability Concepts*.

Usage

```
addProbs(A)

predictiveValues(
  A,
  sensitivity = A[1, 1]/sum(A[, 1]),
  specificity = A[2, 2]/sum(A[, 2]),
  prevalence = stop("must provide prevalence")
)
```

Arguments

A	integer matrix, two-dimensional contingency table. For predictiveValues function, this must be a BooleanTest object, or a two-by-two integer matrix of the same with layout as outlined in BooleanTest

sensitivity, specificity
: numeric scalars, sensitivity and specificity of a test. By default, these are calculated by the test-disease contingency table A

prevalence
: numeric scalar or vector, prevalence(s) of disease

Details

addProbs provides the joint, marginal and conditional probabilities of a contingency table.

predictiveValues provides the predictive values based on the sensitivity, specificity of a test, as well as the disease prevalence.

Value

addProbs returns an addProbs object, which is a list consisting of a noquote matrix of joint probabilities, and two noquote matrix of conditional probabilities. A print method is defined for addProbs object.

predictiveValues returns a predictiveValues object, which is a list of three double vector elements named 'Prevalence', 'PVP' and 'PVN'. A print method and an autoplot method are defined for predictiveValues object.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

addmargins rowSums colSums proportions

Examples

```
library(DanielBiostatistics10th)

# Page 69-75, Example 3.4.1 - Example 3.4.8
(d341 = matrix(c(28L, 19L, 41L, 53L, 35L, 38L, 44L, 60L), ncol = 2L, dimnames = list(
  FamilyHx = c('none', 'Bipolar', 'Unipolar', 'UniBipolar'),
  Onset = c('Early', 'Late'))))
class(d341) # 'matrix', i.e., a two-dimensional 'array'
addProbs(d341)

# Page 81, Example 3.5.1
(d351 = matrix(c(436L, 14L, 5L, 495L), nrow = 2L, dimnames = list(
  Test = c('Positive', 'Negative'), Alzheimer = c('Yes', 'No'))))
predictiveValues(d351, prevalence = .113)
predictiveValues(d351, prevalence = c(.005, .98))
```

Chapter04 *Chapter 4*

Description

Functions for Chapter 4, *Probability Distributions*.

Usage

```
binomBar(size, prob, xlim = size, title)

poisBar(lambda, xlim, title)
```

Arguments

size	non-negative integer scalar, number of trials for binomial distribution
prob	numeric scalar between 0 and 1, probability of success on each trial for binomial distribution
xlim	length-two numeric vector, horizontal limit of the figure
title	character scalar, title of the figure
lambda	positive numeric scalar, mean of Poisson distribution

Details

binomBar and poisBar generate bar plots of binomial and Poisson distributions.

Value

binomBar and poisBar returns a `'discreteDistBar'` object, for which a print method, an autolayer and an autoplot method are defined.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

dbinom dpois

Examples

```
library(DanielBiostatistics10th)

# Page 93-97, Example 4.2.1 - Example 4.2.7
d421 = rep(1:8, times = c(62L, 47L, 39L, 39L, 58L, 37L, 4L, 11L))
(fq421 = print_freqs(factor(d421))) # Page 94, Table 4.2.1 and 4.2.2; Page 96, Table 4.2.3
autoplot(fq421, type = 'density', title = 'Page 95, Figure 4.2.1')
autoplot(fq421, type = 'distribution', title = 'Page 96, Figure 4.2.2')

# ?dbinom # 'd' for binomial 'density'; calculate Prob(X = x)
# ?pbinom # 'p' for binomial 'probability'
# `lower.tail = TRUE` (default), calculate Prob(X <= x)
# `lower.tail = FALSE`, calculate Prob(X > x)

# Page 99, Example 4.3.1
dbinom(x = 3L, size = 5L, prob = .858)
# Page 103, Example 4.3.2
dbinom(x = 4L, size = 10L, prob = .14)
# Page 103, Example 4.3.3
(pL = pbinom(q = 5L, size = 25L, prob = .1, lower.tail = TRUE)) # (a) including!
(pU = pbinom(q = 5L, size = 25L, prob = .1, lower.tail = FALSE)) # (b) excluding!
pL + pU # R makes sure they add up to 1
binomBar(size = 25L, prob = .1)
# Page 105, Example 4.3.4
dbinom(x = 7L, size = 12L, prob = .55)
pbinom(q = 5L, size = 12L, prob = .55)
pbinom(q = 7L, size = 12L, prob = .55, lower.tail = FALSE)

# Page 110, Example 4.4.1
dpois(x = 3L, lambda = 12)
# Page 110, Example 4.4.2
ppois(2L, lambda = 12, lower.tail = FALSE)
poisBar(lambda = 12, xlim = 30L)
# Page 110, Example 4.4.3
ppois(1L, lambda = 2)
# Page 111, Example 4.4.4
dpois(3L, lambda = 2)
# Page 112, Example 4.4.5
ppois(5L, lambda = 2, lower.tail = FALSE)

# Page 119. Example 4.6.1
pnorm(2)
# Page 120. Example 4.6.2
pnorm(2.55) - pnorm(-2.55)
1 - 2 * pnorm(-2.55) # alternative solution
# Page 121. Example 4.6.3
pnorm(1.53) - pnorm(-2.74)
# Page 121. Example 4.6.4
pnorm(2.71, lower.tail = FALSE)
# Page 122. Example 4.6.5
pnorm(2.45) - pnorm(.84)
```

```
# Page 122. Example 4.7.1
pnorm(q = 3, mean = 5.4, sd = 1.3)
pnorm(q = (3-5.4)/1.3) # manual solution
# Page 125. Example 4.7.2
pnorm(649, mean = 491, sd = 119) - pnorm(292, mean = 491, sd = 119)
# Page 122. Example 4.7.3
1e4L * pnorm(8.5, mean = 5.4, sd = 1.3, lower.tail = FALSE)
```

`Chapter05to07` *Chapter 5, 6 and 7*

Description

Functions for Chapter 5, *Some Important Sampling Distributions*, Chapter 6, *Estimation* and Chapter 7, *Hypothesis Testing*.

Usage

```
aggregated_z(
  xbar,
  n,
  sd,
  null.value,
  alternative = c("two.sided", "less", "greater"),
  conf.level = 0.95,
  ...
)

aggregated_t(
  xbar,
  xsd,
  n,
  null.value,
  var.equal = FALSE,
  alternative = c("two.sided", "less", "greater"),
  conf.level = 0.95,
  ...
)

prop_CLT(
  x,
  n,
  bool_obs,
  xbar = x/n,
  null.value,
  alternative = c("two.sided", "less", "greater"),
  conf.level = 0.95,
```

```
  ...
)

aggregated_var(
  xsd,
  n,
  null.value,
  alternative = c("two.sided", "less", "greater"),
  conf.level = 0.95,
  ...
)
```

Arguments

`xbar`	numeric scalar or length-two vector. Sample mean(s) for numeric variable(s) $\bar{x}$ or $(\bar{x}_1, \bar{x}_2)$. Sample proportion(s) for binary (i.e., logical) variable(s) $\hat{p}$ or $(\hat{p}_1, \hat{p}_2)$. In the case of two-sample tests, this could also be a numeric scalar indicating the difference in sample means $\bar{x}_1 - \bar{x}_2$ or sample proportions $\hat{p}_1 - \hat{p}_2$
`n`	integer scalar n or length-two vector. Sample size(s) n or (n_1, n_2)
`sd`	numeric scalar or length-two vector. population standard deviation(s) σ or (σ_1, σ_2)
`null.value`	(optional) numeric scalar or length-two vector. Null value(s) of the population mean(s) (μ_0, (μ_{10}, μ_{20}), or $\mu_{10} - \mu_{20}$) for aggregated_z and aggregated_t. Null value(s) of the population proportion(s) (p_0, (p_{10}, p_{20}), or $p_{10} - p_{20}$) for prop_CLT. Null value(s) of the population variance(s) (ratio) (σ_0^2, $(\sigma_{10}^2, \sigma_{20}^2)$, or $\sigma_{10}^2/\sigma_{20}^2$) for aggregated_var. If missing, only the confidence intervals will be computed.
`alternative`	character scalar, alternative hypothesis, either `'two.sided'` (default), `'greater'` or `'less'`
`conf.level`	numeric scalar, confidence level, default 0.95
`...`	potential arguments, not in use currently
`xsd`	numeric scalar or length-two vector. Sample standard deviation(s) $\sigma_{\bar{x}}$ or $(\sigma_{\bar{x}_1}, \sigma_{\bar{x}_2})$
`var.equal`	logical scalar, whether to treat the two population variances as being equal (default `FALSE`) in aggregated_t
`x`	integer scalar or length-two vector, number of positive count(s) of binary (i.e., logical) variable(s)
`bool_obs`	logical vector of Boolean observations, used in one-sample z-test on proportion

Details

aggregated_z performs one- or two-sample z-test using the aggregated statistics of sample mean(s) and sample size(s) when `null.value` is provided. Otherwise, only the confidence interval based on z-distribution is computed.

aggregated_t performs one- or two-sample t-test using the aggregated statistics of sample mean(s), sample standard deviation(s) and sample size(s) when `null.value` is provided. Otherwise, only the confidence interval based on t-distribution is computed.

prop_CLT performs one- or two-sample z-test on proportion(s), using Central Limit Theorem when `null.value` is provided. Otherwise, only the confidence interval based on z-distribution is computed.

aggregated_var performs one-sample χ^2-test on variance, or two-sample F-test on variances, using the aggregated statistics of sample standard deviation(s) and sample size(s) when `null.value` is provided. Otherwise, only the confidence interval based on χ^2- or F-distribution is computed.

Value

aggregated_z returns an `'htest'` object when `null.value` is provided, otherwise returns a length-two numeric vector.

aggregated_t returns an htest object when `null.value` is provided, otherwise returns a length-two numeric vector.

prop_CLT returns an htest object when `null.value` is provided, otherwise returns a length-two numeric vector.

aggregated_var returns an htest object when `null.value` is provided, otherwise returns a length-two numeric vector.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

t.test prop.test var.test

Examples

```
library(DanielBiostatistics10th)

# Page 142, Example 5.3.2
aggregated_z(xbar = 190, sd = 12.7, n = 10L, null.value = 185.6, alternative = 'greater')
# Page 143, Example 5.3.3
pnorm(125, mean = 120, sd = 15/sqrt(50)) - pnorm(115, mean = 120, sd = 15/sqrt(50))
aggregated_z(125, sd = 15, n = 50L, null.value = 120, alternative = 'less')$p.value -
  aggregated_z(115, sd = 15, n = 50L, null.value = 120, alternative = 'less')$p.value

# Page 145, Example 5.4.1
aggregated_z(xbar = c(92, 105), sd = 20, n = 15L, null.value = 0, alternative = 'less')
# Page 148, Example 5.4.2
aggregated_z(xbar = 20, sd = c(15, 20), n = c(35L, 40L), null.value = c(45, 30),
  alternative = 'greater')

# Page 150, Example 5.5.1
prop_CLT(xbar = .4, n = 150L, null.value = .357, alternative = 'greater')
# Page 152, Example 5.5.2
prop_CLT(xbar = .45, n = 200L, null.value = .51, alternative = 'less')

# Page 155, Example 5.6.1
```

```
prop_CLT(xbar = .1, null.value = c(.28, .21), n = c(100L, 100L), alternative = 'greater')
# Page 155, Example 5.6.2
prop_CLT(xbar = .05, null.value = c(.34, .26), n = c(250L, 200L), alternative = 'less')

# Page 166, Example 6.2.1
aggregated_z(xbar = 22, n = 10L, sd = sqrt(45))
# Page 168, Example 6.2.2
aggregated_z(xbar = 84.3, n = 15L, sd = sqrt(144), conf.level = .99)
# Page 168, Example 6.2.3
aggregated_z(xbar = 17.2, n = 35L, sd = 8, conf.level = .9)
# Page 169, Example 6.2.4
head(EXA_C06_S02_04)
aggregated_z(xbar = mean(EXA_C06_S02_04$ACTIVITY), n = nrow(EXA_C06_S02_04), sd = sqrt(.36))

# Page 173, Example 6.3.1
aggregated_t(xbar = 250.8, xsd = 130.9, n = 19L)

# Page 177, Example 6.4.1
aggregated_z(xbar = c(4.5, 3.4), sd = sqrt(c(1, 1.5)), n = c(12L, 15L))
# Page 178, Example 6.4.2
aggregated_z(xbar = c(4.3, 13), sd = c(5.22, 8.97), n = c(328L, 64L), conf.level = .99)
# Page 180, Example 6.4.3
aggregated_t(xbar = c(4.7, 8.8), xsd = c(9.3, 11.5), n = c(18L, 10L), var.equal = TRUE)
# Page 181, Example 6.4.4
aggregated_t(xbar = c(4.7, 8.8), xsd = c(9.3, 11.5), n = c(18L, 10L))
# Welch slightly different from Cochran; textbook explained on Page 182

# Page 185, Example 6.5.1
prop_CLT(xbar = .18, n = 1220L)

# Page 187, Example 6.6.1
prop_CLT(x = c(31L, 53L), n = c(68L, 255L), conf.level = .99)

# Page 190, Example 6.7.1
n_671 = uniroot(f = function(n, sd, level = .95) {
  qnorm(1-(1-level)/2) * sd/sqrt(n) - 5 # half-width of CI <= 5 grams
}, interval = c(0, 2e2), sd = 20)
sprintf('Example 6.7.1 requires a sample size of %d.', ceiling(n_671$root))

# Page 192, Example 6.8.1
n_681 = uniroot(f = function(n, p, level = .95) {
  qnorm(1-(1-level)/2) * sqrt(p*(1-p)/n) - .05
}, interval = c(0, 1e3), p = .35)
sprintf('Example 6.8.1 requires a sample size of %d.', ceiling(n_681$root))

# Page 196, Example 6.9.1
d691 = c(9.7, 12.3, 11.2, 5.1, 24.8, 14.8, 17.7)
sqrt(aggregated_var(xsd = sd(d691), n = length(d691)))

# Page 200, Example 6.10.1
aggregated_var(xsd = c(8.1, 5.9), n = c(16L, 4L))

# Page 222, Example 7.2.1
```

```
aggregated_z(xbar = 27, sd = sqrt(20), n = 10L, null.value = 30)
# Page 226, Example 7.2.2
aggregated_z(xbar = 27, sd = sqrt(20), n = 10L, null.value = 30, alternative = 'less')
# Page 228, Example 7.2.3
head(EXA_C07_S02_03)
t.test(EXA_C07_S02_03$DAYS, mu = 15)
# Page 231, Example 7.2.4
aggregated_z(xbar = 146, sd = 27, n = 157L, null.value = 140, alternative = 'greater')
# Page 232, Example 7.2.5
d725 = c(33.38, 32.15, 34.34, 33.95, 33.46, 34.13, 33.99, 34.10, 33.85,
  34.23, 34.45, 34.19, 33.97, 32.73, 34.05)
t.test(d725, mu = 34.5)

# Page 237, Example 7.3.1
aggregated_z(xbar = c(4.5, 3.4), sd = sqrt(c(1, 1.5)), n = c(12L, 15L), null.value = 0)
# Page 239, Example 7.3.2
head(EXA_C07_S03_02)
with(EXA_C07_S03_02, t.test(x = CONTROL, y = SCI, alternative = 'less', var.equal = TRUE))
# Page 240, Example 7.3.3
aggregated_t(xbar = c(19.16, 9.53), xsd = c(5.29, 2.69), n = c(15L, 30L), null.value = 0)
# Page 242, Example 7.3.4
aggregated_z(xbar = c(59.01, 46.61), sd = c(44.89, 34.85), n = c(53L, 54L), null.value = 0,
  alternative = 'greater')

# Page 251, Example 7.4.1
head(EXA_C07_S04_01)
with(EXA_C07_S04_01, t.test(x = POSTOP, y = PREOP, alternative = 'greater', paired = TRUE))

# Page 258, Example 7.5.1
prop_CLT(x = 24L, n = 301L, null.value = .063, alternative = 'greater')

# Page 261, Example 7.6.1
prop_CLT(x = c(24L, 11L), n = c(44L, 29L), null.value = 0, alternative = 'greater')

# Page 264, Example 7.7.1
head(EXA_C07_S07_01)
aggregated_var(xsd = sd(EXA_C07_S07_01$mass), n = 16L, null.value = 600)

# Page 268, Example 7.8.1
aggregated_var(xsd = c(30.62, 11.37), n = 6L, null.value = 1, alternative = 'greater')
# Page 270, Example 7.8.2
with(EXA_C07_S03_02, var.test(x = CONTROL, y = SCI))
```

`Chapter07_power` *Chapter 7 (Power Curve)*

Description

Functions for Chapter 7, *Hypothesis Testing*.

Usage

```
power_z(
  x,
  null.value,
  sd,
  n,
  std.err = sd/sqrt(n),
  alternative = c("two.sided", "less", "greater"),
  sig.level = 0.05
)
```

Arguments

`x`	numeric vector, mean parameter(s) μ_1 in the alternative hypothesis
`null.value`	numeric scalar, mean parameter μ_0 in the null hypothesis
`sd`	numeric scalar, population standard deviation σ
`n`	integer scalar, sample size n
`std.err`	numeric scalar, standardized error. For one-sample z-test, this is $\sigma/\sqrt{n}$. Be aware of the name clash with stderr
`alternative`	character scalar, alternative hypothesis, either `'two.sided'` (default), `'greater'` or `'less'`
`sig.level`	numeric scalar, significance level (i.e., Type-I-error rate), default .05

Details

power_z calculates the powers at each element of the alternative parameters μ_1, for one-sample z-test

- $H_0 : \mu = \mu_0$ vs. $H_A : \mu \neq \mu_0$, if `alternative = 'two.sided'`
- $H_0 : \mu \leq \mu_0$ vs. $H_A : \mu > \mu_0$, if `alternative = 'greater'`
- $H_0 : \mu \geq \mu_0$ vs. $H_A : \mu < \mu_0$, if `alternative = 'less'`

Value

power_z returns a power object, for which a show method, an autolayer and an autoplot method are defined for power_z object.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

power.t.test

Examples

```
library(DanielBiostatistics10th)

# Page 272, Example 7.9.1
(p791 = power_z(seq.int(from = 16, to = 19, by = .5), null.value = 17.5, sd = 3.6, n = 100L))
# Page 275, Table 7.9.1
autoplot(p791, title = 'Page 275, Figure 7.9.2')

# Page 276, Example 7.9.2
(p792 = power_z(seq.int(from = 50, to = 70, by = 5), null.value = 65, sd = 15, n = 20L,
                sig.level = .01, alternative = 'less'))
autoplot(p792, title = 'Page 277, Figure 7.9.4')
autoplot(p792, all.alternative = TRUE, title = '1-sided vs. 2-sided test')

# Page 278, Example 7.10.1
(n_d7101 <- uniroot(f = function(x) {
  power_z(55, null.value = 65, sd = 15, n = x, sig.level = .01, alternative = 'less') - .95
}, interval = c(0, 50))$root)
(C_d7101 = qnorm(p = .01, mean = 65, sd = 15/sqrt(ceiling(n_d7101)), lower.tail = TRUE))
```

`Chapter09` *Chapter 9*

Description

Functions for Chapter 9, *Simple Linear Regression and Correlation*.

Usage

```
predict_lm(object, newx, level = 0.95, ...)
```

Arguments

`object`	lm object, with one and only one numeric predictor
`newx`	(optional) numeric scalar or vector, new x-value(s) for which the fitted response(s) are to be reported
`level`	numeric scalar, tolerance/confidence level, default .95
`...`	potential arguments, not in use currently

Value

predict_lm returns a predict_lm object, for which a print method, an autolayer and an autoplot method are defined.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

predict.lm

Examples

```
library(DanielBiostatistics10th)

# Page 417, Example 9.3.1
head(EXA_C09_S03_01)
names(EXA_C09_S03_01)[2:3] = c('Waist', 'AT')
plot(AT ~ Waist, data = EXA_C09_S03_01, xlab = 'Waist circumference (cm), X',
     ylab = 'Deep abdominal AT area (cm2), Y', main = 'Page 419, Figure 9.3.1')

# Page 436, Example 9.4.2
summary(m931 <- lm(AT ~ Waist, data = EXA_C09_S03_01))
cor(EXA_C09_S03_01[2:3]); cor.test(~ AT + Waist, data = EXA_C09_S03_01)
confint(m931) # confidence interval of regression coefficients
anova(m931)

# Page 440, Example 9.4.3
plot(m931, which = 1, main = 'Page 440, Figure 9.4.8')

# Page 441, Section 9.5
autoplot(predict_lm(m931), xlab = 'Waist circumference (cm), X',
         ylab = 'Deep abdominal AT area (cm2), Y',
         title = 'Page 422, Figure 9.3.3; Page 442, Figure 9.5.1')

# Page 447, Example 9.7.1
head(EXA_C09_S07_01)
summary(mod_971 <- lm(CV ~ HEIGHT, data = EXA_C09_S07_01))
autoplot(predict_lm(mod_971), xlab = 'Height (cm)', ylab = 'Cv (units)',
         title = 'Page 449, Figure 9.7.2')

# Page 452, Example 9.7.2
cor(EXA_C09_S07_01); cor.test(~ CV + HEIGHT, data = EXA_C09_S07_01)
# Page 451, Figure 9.7.4, Figure 9.7.5

# Page 453, When the Hypothesized rho Is a Nonzero Value
# R does not have a function to do this
```

Chapter11 *Chapter 11*

Description

Functions for Chapter 11, *Regression Analysis: Some Additional Techniques*.

Usage

```
predict_glm_binomial(object, newx, level = 0.95, ...)
```

Arguments

`object`	glm object with binomial link function, i.e., a logistic regression model, as well as one and only one numeric predictor
`newx`	(optional) numeric scalar or vector, new x-value(s) for which the fitted response(s) are to be reported
`level`	numeric scalar, tolerance/confidence level, default .95
`...`	potential arguments, not in use currently

Value

predict_glm_binomial returns a predict_glm_binomial object, for which a print method, an autolayer and an autoplot method are defined.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

See Also

predict.glm

Examples

```
library(DanielBiostatistics10th)
library(car)
library(DescTools)

# Page 540, Example 11.1.1
head(EXA_C11_S01_01)
head(log(EXA_C11_S01_01$conc, base = 10))
head(EXA_C11_S01_01$logConc)

# Page 542, Example 11.1.2
head(EXA_C11_S01_02)
cor.test(~ sbp + weight, data = EXA_C11_S01_02)
cor.test(~ sbp + bmi, data = EXA_C11_S01_02)

# Page 545, Example 11.2.1
head(EXA_C11_S02_01)
d1121 = within(EXA_C11_S02_01, expr = {
  SMOKE = as.logical(SMOKE)
})
xlab1121 = 'Length of gestation (weeks)'; ylab1121 = 'Birth weight (grams)'
car::scatterplot(GRAMS ~ WEEKS | SMOKE, data = d1121, regLine = FALSE, smooth = FALSE,
                 xlab = xlab1121, ylab = ylab1121, main = 'Page 547, Figure 11.2.1')
```

```
# Page 547, Figure 11.2.2: main model (without interaction)
summary(m1121_main <- lm(GRAMS ~ WEEKS + SMOKE, data = d1121))
confint(m1121_main)
car::scatterplot(GRAMS ~ WEEKS | SMOKE, data = d1121, regLine = FALSE, smooth = FALSE,
                 xlab = xlab1121, ylab = ylab1121, main = 'Page 548, Figure 11.2.3')
(cf_main = m1121_main$coefficients)
abline(a = cf_main[1L], b = cf_main[2L], col = 'blue') # regression line for non-smoking mothers
abline(a = cf_main[1L] + cf_main[3L], b = cf_main[2L], col = 'magenta')

# Page 551, Example 11.2.3
d1123 = within(EXA_C11_S02_03, expr = {
 METHOD = factor(METHOD, levels = c('C', 'A', 'B')) # textbook designated 'C' as reference level
})
summary(mod_1123 <- lm(EFFECT ~ AGE * METHOD, data = d1123)) # Page 555, Figure 11.2.5
confint(mod_1123)
car::scatterplot(EFFECT ~ AGE | METHOD, data = d1123, smooth = FALSE,
           xlab = 'Age', ylab = 'Treatment effectiveness', main = 'Page 555, Figure 11.2.6')

# (optional) Page 561, Example 11.3.1
head(EXA_C11_S03_01)
names(EXA_C11_S03_01) = c('JOBPER', 'ASRV', 'ENTH', 'AMB', 'COMM', 'PROB', 'INIT')
summary(mod_1131_raw <- lm(JOBPER ~ ASRV + ENTH + AMB + COMM + PROB + INIT, data = EXA_C11_S03_01))
# summary(mod_1131 <- MASS::stepAIC(mod_1131_raw, direction = 'backward'))
# the stepwise selection criterion used in MINITAB is not necessarily AIC

# Page 572, Example 11.4.1
addmargins(d1141 <- array(c(92L, 21L, 15L, 20L), dim = c(2L, 2L), dimnames = list(
  OCAD = c('Present', 'Absent'), Sex = c('Male', 'Female')))) # Page 572, Table 11.4.2
(d1141a = within(as.data.frame(as.table(d1141)), expr = {
  OCAD = (OCAD == 'Present')
  Sex = factor(Sex, levels = c('Female', 'Male'))
}))
(m1141 = glm(OCAD ~ Sex, family = binomial(link = 'logit'), weights = Freq, data = d1141a))
summary(m1141) # Page 573, Figure 11.4.1
exp(m1141$coefficients[2L]) # exp(beta_M)
exp(confint(m1141)) # confidence interval of exp(beta)
predict(m1141, newdata = data.frame(Sex = setNames(nm = c('Male', 'Female'))), type = 'response')

# Page 573, Example 11.4.2
head(EXA_C11_S04_02)
summary(mod_1142 <- glm(ATT ~ AGE, family = binomial, data = EXA_C11_S04_02))
# .. Page 575, Figure 11.4.2
exp(mod_1142$coefficients[2L])
exp(confint(mod_1142))
car::Anova(mod_1142) # Optional
autoplot(predict_glm_binomial(mod_1142, newx = c(50, 65, 80)), title = 'Page 576, Figure 11.4.3')

# (optional) Page 576, Example 11.4.3
head(REV_C11_24)
summary(glm(ONSET ~ HIAA + TRYPT, family = binomial(link = 'logit'), data = REV_C11_24))
# Page 577, Figure 11.4.4
# Predictor TRYPT should be removed from model due to p-value \approx 1
summary(glm(ONSET ~ HIAA, family = binomial(link = 'logit'), data = REV_C11_24))
```

```
# (optional) Page 578, Example 11.4.4
DescTools::PseudoR2(mod_1142, which = 'CoxSnell')
DescTools::PseudoR2(mod_1142, which = 'Nagelkerke')

# (optional) Page 579, Example 11.4.5 (same as Example 11.4.4)
```

`Chapter12` *Chapter 12*

Description

Functions for Chapter 12, *The Chi-Square Distribution and The Analysis of Frequencies*.

Usage

```
relativeRisk(A)

oddsRatio(A)

print_OE(O, prob)
```

Arguments

A	a BooleanRisk object, or a two-by-two integer matrix of the same with layout as outlined in BooleanRisk
O	integer vector, observed counts
prob	numeric vector, anticipated probability. If missing (default), an uniform distribution across all categories are used.

Value

relativeRisk returns a `'logRelativeRisk'` object, for which a vcov method and a print method are defined.

oddsRatio returns a `'logOddsRatio'` object, for which a vcov method and a print method are defined.

print_OE prints a table with observed and expected frequencies, as well as the category-wise χ^2 statistics. A double vector of the category-wise χ^2 statistics is returned invisibly.

References

Wayne W. Daniel, *Biostatistics: A Foundation for Analysis in the Health Sciences*, Tenth Edition. Wiley, ISBN: 978-1-119-62550-6.

Examples

```
library(DanielBiostatistics10th)

# Page 605, Example 12.3.1
d1231_b = c(-Inf, seq.int(from = 125, to = 275, by = 25), Inf)
(d1231 = setNames( # Page 605, Table 12.3.1
  c(1L, 3L, 8L, 18L, 6L, 4L, 4L, 3L),
  nm = levels(cut(double(), breaks = d1231_b, right = FALSE, include.lowest = TRUE))))
chi1231 = print_OE(d1231, prob = diff.default(pnorm(q = d1231_b, mean = 198.67, sd = 41.31)))
pchisq(sum(chi1231), df = length(d1231) - 3L, lower.tail = FALSE)
# -3L: three restrictions (explained on Page 608)
# (1) making sum(xo) == sum(xe)
# (2) estimating mean
# (3) estimating sd

# Page 609, Example 12.3.2
# 100 doctors, 25 patients per doctor
d1232 = c(5L, 6L, 8L, 10L, 10L, 15L, 17L, 10L, 10L, 9L, 0L)
o1232 = setNames(c(sum(d1232[1:2]), d1232[-(1:2)]), nm = c('0-1', 2:9, '10 or more'))
(p1232 = sum((0:10) * d1232) / (25 * 100)) # binomial `prob`
chi1232 = print_OE(o1232, prob = c(
  pbinom(1L, size = 25L, prob = p1232),
  dbinom(2:9, size = 25L, prob = p1232),
  pbinom(9, size = 25L, prob = p1232, lower.tail = FALSE)))
pchisq(sum(chi1232), df = length(o1232) - 2L, lower.tail = FALSE)
# -2L: two restrictions (explained on Page 611)
# (1) making sum(o) == sum(e)
# (2) estimating p1232

# Page 611, Example 12.3.3
d1233 = c(5L, 14L, 15L, 23L, 16L, 9L, 3L, 3L, 1L, 1L, 0L)
o_1233 = setNames(c(d1233[1:8], sum(d1233[-(1:8)])), nm = c(0:7, '8 or more'))
p_1233 = c(dpois(0:7, lambda = 3), # lambda = 3 is provided by the textbook
           ppois(7L, lambda = 3, lower.tail = FALSE))
chi1233 = print_OE(o_1233, prob = p_1233)
pchisq(sum(chi1233), df = length(o_1233) - 1L, lower.tail = FALSE)
# -1L: one restrictions
# (1) making sum(xo) == sum(xe)
chisq.test(o_1233, p = p_1233) # equivalent # warning on any(E < 5)

# Page 614, Example 12.3.4
d1234 = c('Dec 05' = 62L, 'Jan 06' = 84L, 'Feb 06' = 17L, 'Mar 06' = 16L, 'Apr 06' = 21L)
chi1234 = print_OE(d1234)
pchisq(sum(chi1234), df = length(d1234) - 1L, lower.tail = FALSE)
chisq.test(d1234) # equivalent

# Page 616, Example 12.3.5
d1235 = c(dominant = 43L, heterozygous = 125L, recessive = 32L)
chi1235 = print_OE(d1235, prob = c(1, 2, 1))
pchisq(sum(chi1235), df = length(d1235) - 1L, lower.tail = FALSE)
chisq.test(d1235, p = c(1, 2, 1), rescale.p = TRUE) # equivalent
```

```
# Page 621, Example 12.4.1
addmargins(d1241 <- array(c(260L, 15L, 7L, 299L, 41L, 14L), dim = c(3L, 2L), dimnames = list(
  Race = c('White', 'Black', 'Other'),
  FolicAcid = c('TRUE', 'FALSE'))))
chisq.test(d1241) # ?stats::chisq.test

# Page 626, Example 12.4.2
addmargins(d1242 <- array(c(131L, 14L, 52L, 36L), dim = c(2L, 2L), dimnames = list(
  Type = c('Faller', 'Non-Faller'),
  LifestyleChange = c('TRUE', 'FALSE'))))
chisq.test(d1242, correct = FALSE)
chisq.test(d1242, correct = TRUE) # Page 627, Yates's Correction

# Page 631, Example 12.5.1
addmargins(d1251 <- array(c(21L, 19L, 75L, 77L), dim = c(2L, 2L), dimnames = list(
  Group = c('Narcoleptic', 'Healthy'),
  Migraine = c('TRUE', 'FALSE'))))
(chisq_1251 = chisq.test(d1251, correct = FALSE))
if (FALSE) {
  # (optional) using test on two proportions
  # only equivalent for 2*2 contingency table
  (clt_1251 = prop_CLT(x = c(21L, 19L), n = 96L, null.value = 0))
  all.equal.numeric(unname(clt_1251$statistic^2), unname(chisq_1251$statistic))
}

# Page 638, Example 12.6.1
addmargins(d1262 <- array(c(2L, 8L, 7L, 4L), dim = c(2L, 2L), dimnames = list(
  Group = c('PI_Naive', 'PA_Experienced'),
  Regimen2yr = c('TRUE', 'FALSE'))))
fisher.test(d1262)

# Page 644, Example 12.7.1
addmargins(d1271 <- array(c(22L, 18L, 216L, 199L), dim = c(2L, 2L),
 dimnames = list(Exercising = c('Extreme', 'No'), PretermLabor = c('TRUE', 'FALSE'))))
relativeRisk(d1271)
# textbook confidence interval (.65, 1.86) wrong (too many rounding in intermediate steps)

# Page 647, Example 12.7.2
addmargins(d1272 <- array(c(64L, 68L, 342L, 3496L), dim = c(2L, 2L), dimnames = list(
  SmkPregnancy = c('TRUE', 'FALSE'),
  Obesity = c('TRUE', 'FALSE'))))
oddsRatio(d1272)

# Page 650, Example 12.7.3
# Page 652, Example 12.7.4
(d1273 <- array(c(21L, 16L, 11L, 6L, 50L, 18L, 14L, 6L), dim = c(2L, 2L, 2L), dimnames = list(
  HTN = c('Present', 'Absent'), OCAD = c('Cases', 'Controls'),
  Age = c('<=55', '>55'))))
addmargins(d1273, margin = 1:2) # Page 651, Table 12.7.6
mantelhaen.test(d1273)
```

EXA_C01_S04_01 *Data of Example 1.4.1*

Description

EXA_C01_S04_01

Usage

```
EXA_C01_S04_01
```

Format

A data.frame with 189 rows and 2 columns

EXA_C02_S05_05 *Data of Example 2.5.5*

Description

EXA_C02_S05_05

Usage

```
EXA_C02_S05_05
```

Format

A data.frame with 20 rows and 1 columns

EXA_C06_S02_04 *Data of Example 6.2.4*

Description

EXA_C06_S02_04

Usage

```
EXA_C06_S02_04
```

Format

A data.frame with 35 rows and 1 columns

EXA_C07_S02_03 *Data of Example 7.2.3*

Description

EXA_C07_S02_03

Usage

EXA_C07_S02_03

Format

A data.frame with 17 rows and 2 columns

EXA_C07_S03_02 *Data of Example 7.3.2*

Description

EXA_C07_S03_02

Usage

EXA_C07_S03_02

Format

A data.frame with 10 rows and 2 columns

EXA_C07_S04_01 *Data of Example 7.4.1*

Description

EXA_C07_S04_01

Usage

EXA_C07_S04_01

Format

A data.frame with 12 rows and 2 columns

EXA_C07_S07_01 *Data of Example 7.7.1*

Description

EXA_C07_S07_01

Usage

```
EXA_C07_S07_01
```

Format

A data.frame with 17 rows and 1 columns

EXA_C08_S02_01 *Data of Example 8.2.1*

Description

EXA_C08_S02_01

Usage

```
EXA_C08_S02_01
```

Format

A data.frame with 144 rows and 2 columns

EXA_C08_S03_01 *Data of Example 8.3.1*

Description

EXA_C08_S03_01

Usage

```
EXA_C08_S03_01
```

Format

A data.frame with 15 rows and 3 columns

`EXA_C08_S04_01` *Data of Example 8.4.1*

Description

`EXA_C08_S04_01`

Usage

`EXA_C08_S04_01`

Format

A data.frame with 72 rows and 3 columns

`EXA_C08_S04_02` *Data of Example 8.4.2*

Description

`EXA_C08_S04_02`

Usage

`EXA_C08_S04_02`

Format

A data.frame with 25 rows and 6 columns

`EXA_C08_S05_02` *Data of Example 8.5.2*

Description

`EXA_C08_S05_02`

Usage

`EXA_C08_S05_02`

Format

A data.frame with 80 rows and 3 columns

EXA_C09_S03_01 *Data of Example 9.3.1*

Description

EXA_C09_S03_01

Usage

EXA_C09_S03_01

Format

A data.frame with 109 rows and 3 columns

EXA_C09_S07_01 *Data of Example 9.7.1*

Description

EXA_C09_S07_01

Usage

EXA_C09_S07_01

Format

A data.frame with 155 rows and 2 columns

EXA_C10_S03_01 *Data of Example 10.3.1*

Description

EXA_C10_S03_01

Usage

EXA_C10_S03_01

Format

A data.frame with 71 rows and 3 columns

EXA_C10_S06_01 *Data of Example 10.6.1*

Description

EXA_C10_S06_01

Usage

```
EXA_C10_S06_01
```

Format

A data.frame with 29 rows and 3 columns

EXA_C11_S01_01 *Data of Example 11.1.1*

Description

EXA_C11_S01_01

Usage

```
EXA_C11_S01_01
```

Format

A data.frame with 25 rows and 3 columns

EXA_C11_S01_02 *Data of Example 11.1.2*

Description

EXA_C11_S01_02

Usage

```
EXA_C11_S01_02
```

Format

A data.frame with 15 rows and 4 columns

EXA_C11_S02_01 *Data of Example 11.2.1*

Description

EXA_C11_S02_01

Usage

EXA_C11_S02_01

Format

A data.frame with 100 rows and 4 columns

EXA_C11_S02_03 *Data of Example 11.2.3*

Description

EXA_C11_S02_03

Usage

EXA_C11_S02_03

Format

A data.frame with 36 rows and 3 columns

EXA_C11_S03_01 *Data of Example 11.3.1*

Description

EXA_C11_S03_01

Usage

EXA_C11_S03_01

Format

A data.frame with 30 rows and 7 columns

EXA_C11_S04_02 *Data of Example 11.4.2*

Description

EXA_C11_S04_02

Usage

EXA_C11_S04_02

Format

A data.frame with 184 rows and 2 columns

EXA_C11_S05_01 *Data of Example 11.5.1*

Description

EXA_C11_S05_01

Usage

EXA_C11_S05_01

Format

A data.frame with 45 rows and 4 columns

EXA_C12_S02_03 *Data of Example 12.2.3*

Description

EXA_C12_S02_03

Usage

EXA_C12_S02_03

Format

A data.frame with 90 rows and 2 columns

EXA_C13_S03_02 *Data of Example 13.3.2*

Description

EXA_C13_S03_02

Usage

```
EXA_C13_S03_02
```

Format

A data.frame with 12 rows and 3 columns

EXA_C13_S05_01 *Data of Example 13.5.1*

Description

EXA_C13_S05_01

Usage

```
EXA_C13_S05_01
```

Format

A data.frame with 16 rows and 2 columns

EXA_C13_S06_01 *Data of Example 13.6.1*

Description

EXA_C13_S06_01

Usage

```
EXA_C13_S06_01
```

Format

A data.frame with 15 rows and 2 columns

EXA_C13_S07_01 *Data of Example 13.7.1*

Description

EXA_C13_S07_01

Usage

EXA_C13_S07_01

Format

A data.frame with 36 rows and 1 columns

EXA_C13_S08_02 *Data of Example 13.8.2*

Description

EXA_C13_S08_02

Usage

EXA_C13_S08_02

Format

A data.frame with 10 rows and 5 columns

EXA_C13_S09_01 *Data of Example 13.9.1*

Description

EXA_C13_S09_01

Usage

EXA_C13_S09_01

Format

A data.frame with 9 rows and 4 columns

EXA_C13_S09_02 *Data of Example 13.9.2*

Description

EXA_C13_S09_02

Usage

```
EXA_C13_S09_02
```

Format

A data.frame with 16 rows and 5 columns

EXA_C13_S10_01 *Data of Example 13.10.1*

Description

EXA_C13_S10_01

Usage

```
EXA_C13_S10_01
```

Format

A data.frame with 20 rows and 3 columns

EXA_C13_S10_02 *Data of Example 13.10.2*

Description

EXA_C13_S10_02

Usage

```
EXA_C13_S10_02
```

Format

A data.frame with 35 rows and 3 columns

EXA_C14_S03_01 *Data of Example 14.3.1*

Description

EXA_C14_S03_01

Usage

EXA_C14_S03_01

Format

A data.frame with 39 rows and 4 columns

EXA_C14_S05_01 *Data of Example 14.5.1*

Description

EXA_C14_S05_01

Usage

EXA_C14_S05_01

Format

A data.frame with 40 rows and 5 columns

EXR_C02_S03_01 *Data of Exercise 2.3.1*

Description

EXR_C02_S03_01

Usage

EXR_C02_S03_01

Format

A data.frame with 90 rows and 1 columns

EXR_C02_S03_02 *Data of Exercise 2.3.2*

Description

EXR_C02_S03_02

Usage

```
EXR_C02_S03_02
```

Format

A data.frame with 159 rows and 1 columns

EXR_C02_S03_03 *Data of Exercise 2.3.3*

Description

EXR_C02_S03_03

Usage

```
EXR_C02_S03_03
```

Format

A data.frame with 29 rows and 1 columns

EXR_C02_S03_04 *Data of Exercise 2.3.4*

Description

EXR_C02_S03_04

Usage

```
EXR_C02_S03_04
```

Format

A data.frame with 53 rows and 1 columns

EXR_C02_S03_05 *Data of Exercise 2.3.5*

Description

EXR_C02_S03_05

Usage

```
EXR_C02_S03_05
```

Format

A data.frame with 45 rows and 1 columns

EXR_C02_S03_06 *Data of Exercise 2.3.6*

Description

EXR_C02_S03_06

Usage

```
EXR_C02_S03_06
```

Format

A data.frame with 60 rows and 1 columns

EXR_C02_S03_07 *Data of Exercise 2.3.7*

Description

EXR_C02_S03_07

Usage

```
EXR_C02_S03_07
```

Format

A data.frame with 155 rows and 1 columns

EXR_C02_S03_08 *Data of Exercise 2.3.8*

Description

EXR_C02_S03_08

Usage

```
EXR_C02_S03_08
```

Format

A data.frame with 30 rows and 1 columns

EXR_C02_S03_09 *Data of Exercise 2.3.9*

Description

EXR_C02_S03_09

Usage

```
EXR_C02_S03_09
```

Format

A data.frame with 50 rows and 2 columns

EXR_C02_S03_11 *Data of Exercise 2.3.11*

Description

EXR_C02_S03_11

Usage

```
EXR_C02_S03_11
```

Format

A data.frame with 216 rows and 1 columns

EXR_C02_S03_12 *Data of Exercise 2.3.12*

Description

EXR_C02_S03_12

Usage

EXR_C02_S03_12

Format

A data.frame with 109 rows and 1 columns

EXR_C02_S05_03 *Data of Exercise 2.5.3*

Description

EXR_C02_S05_03

Usage

EXR_C02_S05_03

Format

A data.frame with 30 rows and 1 columns

EXR_C02_S05_06 *Data of Exercise 2.5.6*

Description

EXR_C02_S05_06

Usage

EXR_C02_S05_06

Format

A data.frame with 20 rows and 1 columns

EXR_C06_S02_05 *Data of Exercise 6.2.5*

Description

EXR_C06_S02_05

Usage

```
EXR_C06_S02_05
```

Format

A data.frame with 16 rows and 1 columns

EXR_C06_S04_10 *Data of Exercise 6.4.10*

Description

EXR_C06_S04_10

Usage

```
EXR_C06_S04_10
```

Format

A data.frame with 32 rows and 2 columns

EXR_C06_S09_07 *Data of Exercise 6.9.7*

Description

EXR_C06_S09_07

Usage

```
EXR_C06_S09_07
```

Format

A data.frame with 20 rows and 1 columns

EXR_C06_S10_07 *Data of Exercise 6.10.7*

Description

EXR_C06_S10_07

Usage

```
EXR_C06_S10_07
```

Format

A data.frame with 26 rows and 2 columns

EXR_C07_S02_13 *Data of Exercise 7.2.13*

Description

EXR_C07_S02_13

Usage

```
EXR_C07_S02_13
```

Format

A data.frame with 20 rows and 1 columns

EXR_C07_S02_15 *Data of Exercise 7.2.15*

Description

EXR_C07_S02_15

Usage

```
EXR_C07_S02_15
```

Format

A data.frame with 50 rows and 1 columns

EXR_C07_S02_16 *Data of Exercise 7.2.16*

Description

EXR_C07_S02_16

Usage

EXR_C07_S02_16

Format

A data.frame with 21 rows and 1 columns

EXR_C07_S03_03 *Data of Exercise 7.3.3*

Description

EXR_C07_S03_03

Usage

EXR_C07_S03_03

Format

A data.frame with 63 rows and 2 columns

EXR_C07_S03_04 *Data of Exercise 7.3.4*

Description

EXR_C07_S03_04

Usage

EXR_C07_S03_04

Format

A data.frame with 174 rows and 2 columns

EXR_C07_S03_05 *Data of Exercise 7.3.5*

Description

EXR_C07_S03_05

Usage

```
EXR_C07_S03_05
```

Format

A data.frame with 82 rows and 2 columns

EXR_C07_S03_10 *Data of Exercise 7.3.10*

Description

EXR_C07_S03_10

Usage

```
EXR_C07_S03_10
```

Format

A data.frame with 24 rows and 2 columns

EXR_C07_S03_11 *Data of Exercise 7.3.11*

Description

EXR_C07_S03_11

Usage

```
EXR_C07_S03_11
```

Format

A data.frame with 20 rows and 2 columns

EXR_C07_S03_12 *Data of Exercise 7.3.12*

Description

EXR_C07_S03_12

Usage

```
EXR_C07_S03_12
```

Format

A data.frame with 90 rows and 2 columns

EXR_C07_S04_01 *Data of Exercise 7.4.1*

Description

EXR_C07_S04_01

Usage

```
EXR_C07_S04_01
```

Format

A data.frame with 15 rows and 2 columns

EXR_C07_S04_02 *Data of Exercise 7.4.2*

Description

EXR_C07_S04_02

Usage

```
EXR_C07_S04_02
```

Format

A data.frame with 66 rows and 2 columns

EXR_C07_S04_03 *Data of Exercise 7.4.3*

Description

EXR_C07_S04_03

Usage

```
EXR_C07_S04_03
```

Format

A data.frame with 11 rows and 2 columns

EXR_C07_S04_04 *Data of Exercise 7.4.4*

Description

EXR_C07_S04_04

Usage

```
EXR_C07_S04_04
```

Format

A data.frame with 20 rows and 2 columns

EXR_C07_S08_07 *Data of Exercise 7.8.7*

Description

EXR_C07_S08_07

Usage

```
EXR_C07_S08_07
```

Format

A data.frame with 23 rows and 2 columns

EXR_C08_S02_01 *Data of Exercise 8.2.1*

Description

EXR_C08_S02_01

Usage

```
EXR_C08_S02_01
```

Format

A data.frame with 329 rows and 2 columns

EXR_C08_S02_02 *Data of Exercise 8.2.2*

Description

EXR_C08_S02_02

Usage

```
EXR_C08_S02_02
```

Format

A data.frame with 96 rows and 2 columns

EXR_C08_S02_03 *Data of Exercise 8.2.3*

Description

EXR_C08_S02_03

Usage

```
EXR_C08_S02_03
```

Format

A data.frame with 113 rows and 2 columns

`EXR_C08_S02_04` *Data of Exercise 8.2.4*

Description

`EXR_C08_S02_04`

Usage

`EXR_C08_S02_04`

Format

A data.frame with 164 rows and 2 columns

`EXR_C08_S02_05` *Data of Exercise 8.2.5*

Description

`EXR_C08_S02_05`

Usage

`EXR_C08_S02_05`

Format

A data.frame with 29 rows and 2 columns

`EXR_C08_S02_06` *Data of Exercise 8.2.6*

Description

`EXR_C08_S02_06`

Usage

`EXR_C08_S02_06`

Format

A data.frame with 90 rows and 2 columns

EXR_C08_S02_07 *Data of Exercise 8.2.7*

Description

EXR_C08_S02_07

Usage

```
EXR_C08_S02_07
```

Format

A data.frame with 178 rows and 2 columns

EXR_C08_S03_01 *Data of Exercise 8.3.1*

Description

EXR_C08_S03_01

Usage

```
EXR_C08_S03_01
```

Format

A data.frame with 96 rows and 3 columns

EXR_C08_S03_02 *Data of Exercise 8.3.2*

Description

EXR_C08_S03_02

Usage

```
EXR_C08_S03_02
```

Format

A data.frame with 10 rows and 5 columns

`EXR_C08_S03_03` *Data of Exercise 8.3.3*

Description

`EXR_C08_S03_03`

Usage

`EXR_C08_S03_03`

Format

A data.frame with 20 rows and 3 columns

`EXR_C08_S03_04` *Data of Exercise 8.3.4*

Description

`EXR_C08_S03_04`

Usage

`EXR_C08_S03_04`

Format

A data.frame with 16 rows and 3 columns

`EXR_C08_S03_05` *Data of Exercise 8.3.5*

Description

`EXR_C08_S03_05`

Usage

`EXR_C08_S03_05`

Format

A data.frame with 12 rows and 3 columns

EXR_C08_S04_01 *Data of Exercise 8.4.1*

Description

EXR_C08_S04_01

Usage

```
EXR_C08_S04_01
```

Format

A data.frame with 40 rows and 3 columns

EXR_C08_S04_02 *Data of Exercise 8.4.2*

Description

EXR_C08_S04_02

Usage

```
EXR_C08_S04_02
```

Format

A data.frame with 35 rows and 3 columns

EXR_C08_S04_03 *Data of Exercise 8.4.3*

Description

EXR_C08_S04_03

Usage

```
EXR_C08_S04_03
```

Format

A data.frame with 48 rows and 3 columns

EXR_C08_S04_06 *Data of Exercise 8.4.6*

Description

`EXR_C08_S04_06`

Usage

`EXR_C08_S04_06`

Format

A data.frame with 20 rows and 6 columns

EXR_C08_S05_01 *Data of Exercise 8.5.1*

Description

`EXR_C08_S05_01`

Usage

`EXR_C08_S05_01`

Format

A data.frame with 24 rows and 3 columns

EXR_C08_S05_02 *Data of Exercise 8.5.2*

Description

`EXR_C08_S05_02`

Usage

`EXR_C08_S05_02`

Format

A data.frame with 72 rows and 3 columns

EXR_C08_S05_03 *Data of Exercise 8.5.3*

Description

EXR_C08_S05_03

Usage

```
EXR_C08_S05_03
```

Format

A data.frame with 44 rows and 3 columns

EXR_C08_S05_04 *Data of Exercise 8.5.4*

Description

EXR_C08_S05_04

Usage

```
EXR_C08_S05_04
```

Format

A data.frame with 13 rows and 3 columns

EXR_C09_S03_02 *Data of Exercise 9.3.2*

Description

EXR_C09_S03_02

Usage

```
EXR_C09_S03_02
```

Format

A data.frame with 10 rows and 2 columns

`EXR_C09_S03_03` *Data of Exercise 9.3.3*

Description

`EXR_C09_S03_03`

Usage

```
EXR_C09_S03_03
```

Format

A data.frame with 17 rows and 2 columns

`EXR_C09_S03_04` *Data of Exercise 9.3.4*

Description

`EXR_C09_S03_04`

Usage

```
EXR_C09_S03_04
```

Format

A data.frame with 90 rows and 2 columns

`EXR_C09_S03_06` *Data of Exercise 9.3.6*

Description

`EXR_C09_S03_06`

Usage

```
EXR_C09_S03_06
```

Format

A data.frame with 22 rows and 2 columns

EXR_C09_S03_07 *Data of Exercise 9.3.7*

Description

EXR_C09_S03_07

Usage

```
EXR_C09_S03_07
```

Format

A data.frame with 27 rows and 2 columns

EXR_C09_S07_01 *Data of Exercise 9.7.1*

Description

EXR_C09_S07_01

Usage

```
EXR_C09_S07_01
```

Format

A data.frame with 20 rows and 2 columns

EXR_C09_S07_02 *Data of Exercise 9.7.2*

Description

EXR_C09_S07_02

Usage

```
EXR_C09_S07_02
```

Format

A data.frame with 90 rows and 2 columns

EXR_C09_S07_04 *Data of Exercise 9.7.4*

Description

EXR_C09_S07_04

Usage

```
EXR_C09_S07_04
```

Format

A data.frame with 18 rows and 2 columns

EXR_C09_S07_05 *Data of Exercise 9.7.5*

Description

EXR_C09_S07_05

Usage

```
EXR_C09_S07_05
```

Format

A data.frame with 30 rows and 2 columns

EXR_C09_S07_06 *Data of Exercise 9.7.6*

Description

EXR_C09_S07_06

Usage

```
EXR_C09_S07_06
```

Format

A data.frame with 15 rows and 2 columns

EXR_C10_S03_01 *Data of Exercise 10.3.1*

Description

EXR_C10_S03_01

Usage

```
EXR_C10_S03_01
```

Format

A data.frame with 35 rows and 3 columns

EXR_C10_S03_02 *Data of Exercise 10.3.2*

Description

EXR_C10_S03_02

Usage

```
EXR_C10_S03_02
```

Format

A data.frame with 100 rows and 4 columns

EXR_C10_S03_03 *Data of Exercise 10.3.3*

Description

EXR_C10_S03_03

Usage

```
EXR_C10_S03_03
```

Format

A data.frame with 10 rows and 3 columns

EXR_C10_S03_04 *Data of Exercise 10.3.4*

Description

EXR_C10_S03_04

Usage

```
EXR_C10_S03_04
```

Format

A data.frame with 20 rows and 3 columns

EXR_C10_S03_05 *Data of Exercise 10.3.5*

Description

EXR_C10_S03_05

Usage

```
EXR_C10_S03_05
```

Format

A data.frame with 25 rows and 3 columns

EXR_C10_S03_06 *Data of Exercise 10.3.6*

Description

EXR_C10_S03_06

Usage

```
EXR_C10_S03_06
```

Format

A data.frame with 20 rows and 8 columns

EXR_C10_S06_01 *Data of Exercise 10.6.1*

Description

EXR_C10_S06_01

Usage

```
EXR_C10_S06_01
```

Format

A data.frame with 40 rows and 4 columns

EXR_C10_S06_02 *Data of Exercise 10.6.2*

Description

EXR_C10_S06_02

Usage

```
EXR_C10_S06_02
```

Format

A data.frame with 12 rows and 3 columns

EXR_C10_S06_03 *Data of Exercise 10.6.3*

Description

EXR_C10_S06_03

Usage

```
EXR_C10_S06_03
```

Format

A data.frame with 15 rows and 3 columns

EXR_C10_S06_04 *Data of Exercise 10.6.4*

Description

EXR_C10_S06_04

Usage

```
EXR_C10_S06_04
```

Format

A data.frame with 15 rows and 6 columns

EXR_C11_S02_01 *Data of Exercise 11.2.1*

Description

EXR_C11_S02_01

Usage

```
EXR_C11_S02_01
```

Format

A data.frame with 44 rows and 3 columns

EXR_C11_S02_02 *Data of Exercise 11.2.2*

Description

EXR_C11_S02_02

Usage

```
EXR_C11_S02_02
```

Format

A data.frame with 100 rows and 3 columns

EXR_C11_S02_03 *Data of Exercise 11.2.3*

Description

EXR_C11_S02_03

Usage

```
EXR_C11_S02_03
```

Format

A data.frame with 17 rows and 3 columns

EXR_C11_S02_04 *Data of Exercise 11.2.4*

Description

EXR_C11_S02_04

Usage

```
EXR_C11_S02_04
```

Format

A data.frame with 90 rows and 3 columns

EXR_C11_S03_01 *Data of Exercise 11.3.1*

Description

EXR_C11_S03_01

Usage

```
EXR_C11_S03_01
```

Format

A data.frame with 100 rows and 8 columns

`EXR_C11_S03_02` *Data of Exercise 11.3.2*

Description

EXR_C11_S03_02

Usage

```
EXR_C11_S03_02
```

Format

A data.frame with 35 rows and 7 columns

`EXR_C11_S03_03` *Data of Exercise 11.3.3*

Description

EXR_C11_S03_03

Usage

```
EXR_C11_S03_03
```

Format

A data.frame with 68 rows and 7 columns

`EXR_C11_S04_01` *Data of Exercise 11.4.1*

Description

EXR_C11_S04_01

Usage

```
EXR_C11_S04_01
```

Format

A data.frame with 4 rows and 3 columns

EXR_C11_S04_02 *Data of Exercise 11.4.2*

Description

EXR_C11_S04_02

Usage

```
EXR_C11_S04_02
```

Format

A data.frame with 184 rows and 2 columns

EXR_C11_S05_01 *Data of Exercise 11.5.1*

Description

EXR_C11_S05_01

Usage

```
EXR_C11_S05_01
```

Format

A data.frame with 45 rows and 4 columns

EXR_C11_S05_02 *Data of Exercise 11.5.2*

Description

EXR_C11_S05_02

Usage

```
EXR_C11_S05_02
```

Format

A data.frame with 45 rows and 5 columns

EXR_C11_S05_04 *Data of Exercise 11.5.4*

Description

EXR_C11_S05_04

Usage

```
EXR_C11_S05_04
```

Format

A data.frame with 90 rows and 3 columns

EXR_C13_S05_01 *Data of Exercise 13.5.1*

Description

EXR_C13_S05_01

Usage

```
EXR_C13_S05_01
```

Format

A data.frame with 30 rows and 2 columns

EXR_C13_S05_02 *Data of Exercise 13.5.2*

Description

EXR_C13_S05_02

Usage

```
EXR_C13_S05_02
```

Format

A data.frame with 30 rows and 2 columns

EXR_C13_S06_01 *Data of Exercise 13.6.1*

Description

EXR_C13_S06_01

Usage

```
EXR_C13_S06_01
```

Format

A data.frame with 70 rows and 2 columns

EXR_C13_S06_02 *Data of Exercise 13.6.2*

Description

EXR_C13_S06_02

Usage

```
EXR_C13_S06_02
```

Format

A data.frame with 17 rows and 2 columns

EXR_C13_S06_03 *Data of Exercise 13.6.3*

Description

EXR_C13_S06_03

Usage

```
EXR_C13_S06_03
```

Format

A data.frame with 83 rows and 2 columns

EXR_C13_S07_02 *Data of Exercise 13.7.2*

Description

EXR_C13_S07_02

Usage

```
EXR_C13_S07_02
```

Format

A data.frame with 30 rows and 1 columns

EXR_C13_S08_01 *Data of Exercise 13.8.1*

Description

EXR_C13_S08_01

Usage

```
EXR_C13_S08_01
```

Format

A data.frame with 232 rows and 2 columns

EXR_C13_S08_02 *Data of Exercise 13.8.2*

Description

EXR_C13_S08_02

Usage

```
EXR_C13_S08_02
```

Format

A data.frame with 15 rows and 2 columns

EXR_C13_S08_03 *Data of Exercise 13.8.3*

Description

EXR_C13_S08_03

Usage

```
EXR_C13_S08_03
```

Format

A data.frame with 53 rows and 2 columns

EXR_C13_S08_04 *Data of Exercise 13.8.4*

Description

EXR_C13_S08_04

Usage

```
EXR_C13_S08_04
```

Format

A data.frame with 22 rows and 2 columns

EXR_C13_S08_05 *Data of Exercise 13.8.5*

Description

EXR_C13_S08_05

Usage

```
EXR_C13_S08_05
```

Format

A data.frame with 44 rows and 2 columns

EXR_C13_S08_06 *Data of Exercise 13.8.6*

Description

`EXR_C13_S08_06`

Usage

`EXR_C13_S08_06`

Format

A data.frame with 22 rows and 3 columns

EXR_C13_S09_01 *Data of Exercise 13.9.1*

Description

`EXR_C13_S09_01`

Usage

`EXR_C13_S09_01`

Format

A data.frame with 9 rows and 4 columns

EXR_C13_S09_02 *Data of Exercise 13.9.2*

Description

`EXR_C13_S09_02`

Usage

`EXR_C13_S09_02`

Format

A data.frame with 15 rows and 11 columns

EXR_C13_S09_03 *Data of Exercise 13.9.3*

Description

EXR_C13_S09_03

Usage

```
EXR_C13_S09_03
```

Format

A data.frame with 10 rows and 6 columns

EXR_C13_S10_01 *Data of Exercise 13.10.1*

Description

EXR_C13_S10_01

Usage

```
EXR_C13_S10_01
```

Format

A data.frame with 15 rows and 3 columns

EXR_C13_S10_02 *Data of Exercise 13.10.2*

Description

EXR_C13_S10_02

Usage

```
EXR_C13_S10_02
```

Format

A data.frame with 10 rows and 3 columns

`EXR_C13_S10_03` *Data of Exercise 13.10.3*

Description

`EXR_C13_S10_03`

Usage

`EXR_C13_S10_03`

Format

A data.frame with 20 rows and 2 columns

`EXR_C13_S10_04` *Data of Exercise 13.10.4*

Description

`EXR_C13_S10_04`

Usage

`EXR_C13_S10_04`

Format

A data.frame with 20 rows and 2 columns

`EXR_C13_S10_05` *Data of Exercise 13.10.5*

Description

`EXR_C13_S10_05`

Usage

`EXR_C13_S10_05`

Format

A data.frame with 30 rows and 2 columns

EXR_C13_S10_06 *Data of Exercise 13.10.6*

Description

EXR_C13_S10_06

Usage

```
EXR_C13_S10_06
```

Format

A data.frame with 17 rows and 3 columns

EXR_C14_S03_01 *Data of Exercise 14.3.1*

Description

EXR_C14_S03_01

Usage

```
EXR_C14_S03_01
```

Format

A data.frame with 53 rows and 3 columns

EXR_C14_S03_02 *Data of Exercise 14.3.2*

Description

EXR_C14_S03_02

Usage

```
EXR_C14_S03_02
```

Format

A data.frame with 62 rows and 2 columns

`EXR_C14_S04_03` *Data of Exercise 14.4.3*

Description

`EXR_C14_S04_03`

Usage

```
EXR_C14_S04_03
```

Format

A data.frame with 50 rows and 4 columns

`freqs-class` *S4 Class freqs*

Description

S4 Class freqs

Slots

`.Data` integer vector, frequency counts

`data.name` character integer, name of the data, only used in output

`Gosset_Welch` *Two-Sample Student's t-statistic and Welch–Satterthwaite Equation*

Description

To determine the degree of freedom, as well as the standard error, of two-sample t-statistic, with or without the equal-variance assumption.

Usage

```
Gosset_Welch(s1, s2, v1 = s1^2, v2 = s2^2, n1, n2, var.equal = FALSE)
```

Arguments

s1, s2	(optional) double vectors, sample standard deviations of the two samples
v1, v2	double vectors, sample variances of the two samples, default $v_1 = s_1^2$, $v_2 = s_2^2$.
n1, n2	integer vectors, sample sizes of the two samples
var.equal	logical scalar, whether to treat the two variances as being equal when calculating the degree of freedom and the standard error of the mean-difference. If `FALSE` (default), Welch–Satterthwaite equation is used. If `TRUE`, the original two-sample t-test from William Sealy Gosset is used.

Value

Gosset_Welch returns a numeric scalar of the degree of freedom, with a numeric scalar attribute `'std.err'` of the standard error of the mean-difference.

References

Student's t-test by William Sealy Gosset, doi:10.1093/biomet/6.1.1.

Welch–Satterthwaite equation by Bernard Lewis Welch and F. E. Satterthwaite doi:10.2307/3002019 and doi:10.1093/biomet/34.12.28.

See Also

t.test

Examples

```
x = rnorm(32L, sd = 1.6); y = rnorm(57L, sd = 2.1)
vx = var(x); vy = var(y); nx = length(x); ny = length(y)
t.test(x, y, var.equal = FALSE)[c('parameter', 'stderr')]
Gosset_Welch(v1 = vx, v2 = vy, n1 = nx, n2 = ny, var.equal = FALSE)
t.test(x, y, var.equal = TRUE)[c('parameter', 'stderr')]
Gosset_Welch(v1 = vx, v2 = vy, n1 = nx, n2 = ny, var.equal = TRUE)
```

LDS_C02_NCBIRTH800 *Large Data* NCBIRTH800 *from Chapter 2*

Description

LDS_C02_NCBIRTH800

Usage

```
LDS_C02_NCBIRTH800
```

Format

A data.frame with 800 rows and 14 columns

LDS_C06_BABYWGTS — *Large Data* BABYWGTS *from Chapter 6*

Description

LDS_C06_BABYWGTS

Usage

```
LDS_C06_BABYWGTS
```

Format

A data.frame with 1200 rows and 2 columns

LDS_C06_BOYHGTS — *Large Data* BOYHGTS *from Chapter 6*

Description

LDS_C06_BOYHGTS

Usage

```
LDS_C06_BOYHGTS
```

Format

A data.frame with 1000 rows and 2 columns

LDS_C06_CHOLEST — *Large Data* CHOLEST *from Chapter 6*

Description

LDS_C06_CHOLEST

Usage

```
LDS_C06_CHOLEST
```

Format

A data.frame with 1000 rows and 2 columns

LDS_C07_HEADCIRC *Large Data* HEADCIRC *from Chapter 7*

Description

LDS_C07_HEADCIRC

Usage

```
LDS_C07_HEADCIRC
```

Format

A data.frame with 1000 rows and 3 columns

LDS_C07_HEMOGLOB *Large Data* HEMOGLOB *from Chapter 7*

Description

LDS_C07_HEMOGLOB

Usage

```
LDS_C07_HEMOGLOB
```

Format

A data.frame with 1000 rows and 2 columns

LDS_C07_MANDEXT *Large Data* MANDEXT *from Chapter 7*

Description

LDS_C07_MANDEXT

Usage

```
LDS_C07_MANDEXT
```

Format

A data.frame with 1000 rows and 2 columns

LDS_C07_PCKDATA — *Large Data* PCKDATA *from Chapter 7*

Description

LDS_C07_PCKDATA

Usage

```
LDS_C07_PCKDATA
```

Format

A data.frame with 1005 rows and 3 columns

LDS_C07_PROTHROM — *Large Data* PROTHROM *from Chapter 7*

Description

LDS_C07_PROTHROM

Usage

```
LDS_C07_PROTHROM
```

Format

A data.frame with 1000 rows and 2 columns

LDS_C08_CSFDATA — *Large Data* CSFDATA *from Chapter 8*

Description

LDS_C08_CSFDATA

Usage

```
LDS_C08_CSFDATA
```

Format

A data.frame with 300 rows and 6 columns

LDS_C08_LSADATA *Large Data* LSADATA *from Chapter 8*

Description

LDS_C08_LSADATA

Usage

```
LDS_C08_LSADATA
```

Format

A data.frame with 350 rows and 5 columns

LDS_C08_MEDSCORES *Large Data* MEDSCORES *from Chapter 8*

Description

LDS_C08_MEDSCORES

Usage

```
LDS_C08_MEDSCORES
```

Format

A data.frame with 582 rows and 4 columns

LDS_C08_RBCDATA *Large Data* RBCDATA *from Chapter 8*

Description

LDS_C08_RBCDATA

Usage

```
LDS_C08_RBCDATA
```

Format

A data.frame with 350 rows and 4 columns

LDS_C08_SACEDATA *Large Data* `SACEDATA` *from Chapter 8*

Description

`LDS_C08_SACEDATA`

Usage

```
LDS_C08_SACEDATA
```

Format

A data.frame with 400 rows and 5 columns

LDS_C08_SERUMCHO *Large Data* `SERUMCHO` *from Chapter 8*

Description

`LDS_C08_SERUMCHO`

Usage

```
LDS_C08_SERUMCHO
```

Format

A data.frame with 347 rows and 4 columns

LDS_C09_CALCIUM *Large Data* `CALCIUM` *from Chapter 9*

Description

`LDS_C09_CALCIUM`

Usage

```
LDS_C09_CALCIUM
```

Format

A data.frame with 100 rows and 13 columns

LDS_C09_CEREBRAL *Large Data* CEREBRAL *from Chapter 9*

Description

LDS_C09_CEREBRAL

Usage

```
LDS_C09_CEREBRAL
```

Format

A data.frame with 1050 rows and 3 columns

LDS_C09_HYPERTEN *Large Data* HYPERTEN *from Chapter 9*

Description

LDS_C09_HYPERTEN

Usage

```
LDS_C09_HYPERTEN
```

Format

A data.frame with 1050 rows and 3 columns

LDS_C10_LTEXER *Large Data* LTEXER *from Chapter 10*

Description

LDS_C10_LTEXER

Usage

```
LDS_C10_LTEXER
```

Format

A data.frame with 248 rows and 5 columns

LDS_C10_RESPDIS *Large Data RESPDIS from Chapter 10*

Description

LDS_C10_RESPDIS

Usage

```
LDS_C10_RESPDIS
```

Format

A data.frame with 1200 rows and 6 columns

LDS_C10_RISKFACT *Large Data RISKFACT from Chapter 10*

Description

LDS_C10_RISKFACT

Usage

```
LDS_C10_RISKFACT
```

Format

A data.frame with 1000 rows and 6 columns

LDS_C10_STERLENGTH *Large Data STERLENGTH from Chapter 10*

Description

LDS_C10_STERLENGTH

Usage

```
LDS_C10_STERLENGTH
```

Format

A data.frame with 1162 rows and 4 columns

LDS_C11_AQUATICS *Large Data* AQUATICS *from Chapter 11*

Description

LDS_C11_AQUATICS

Usage

```
LDS_C11_AQUATICS
```

Format

A data.frame with 142 rows and 7 columns

LDS_C11_TEACHERS *Large Data* TEACHERS *from Chapter 11*

Description

LDS_C11_TEACHERS

Usage

```
LDS_C11_TEACHERS
```

Format

A data.frame with 212 rows and 7 columns

LDS_C11_WGTLOSS *Large Data* WGTLOSS *from Chapter 11*

Description

LDS_C11_WGTLOSS

Usage

```
LDS_C11_WGTLOSS
```

Format

A data.frame with 1185 rows and 3 columns

LDS_C12_SMOKING *Large Data* SMOKING *from Chapter 12*

Description

LDS_C12_SMOKING

Usage

```
LDS_C12_SMOKING
```

Format

A data.frame with 1200 rows and 6 columns

LDS_C13_KLETTER *Large Data* KLETTER *from Chapter 13*

Description

LDS_C13_KLETTER

Usage

```
LDS_C13_KLETTER
```

Format

A data.frame with 168 rows and 3 columns

power-class *S4 class power*

Description

S4 class power

Slots

.Data numeric scalar or vector, power(s) calculated at alternative parameter(s) μ_1

x numeric scalar or vector, alternative parameter(s) μ_1

rr RejectionRegion object

RejectionRegion-class   *S4 class RejectionRegion*

Description

S4 class RejectionRegion

Slots

`.Data` numeric scalar for one-sided test, or length-two numeric vector for two-sided test

`null.value` numeric scalar, null value

`std.err` numeric scalar, standard error of sampling distribution

`parameter` numeric vector, additional parameters

`alternative` character scalar, alternative hypothesis

`sig.level` numeric scalar, significance level (Type I error probability)

`test` character scalar, type of test. Currently only `'z'` is supported

REV_C02_13   *Review Exercise 13 of Chapter 2*

Description

REV_C02_13

Usage

```
REV_C02_13
```

Format

A data.frame with 50 rows and 1 columns

REV_C02_15   *Review Exercise 15 of Chapter 2*

Description

REV_C02_15

Usage

```
REV_C02_15
```

Format

A data.frame with 28 rows and 1 columns

REV_C02_16 *Review Exercise 16 of Chapter 2*

Description

REV_C02_16

Usage

```
REV_C02_16
```

Format

A data.frame with 53 rows and 2 columns

REV_C02_19 *Review Exercise 19 of Chapter 2*

Description

REV_C02_19

Usage

```
REV_C02_19
```

Format

A data.frame with 22 rows and 1 columns

REV_C02_29 *Review Exercise 29 of Chapter 2*

Description

REV_C02_29

Usage

```
REV_C02_29
```

Format

A data.frame with 107 rows and 1 columns

REV_C06_22 *Review Exercise 22 of Chapter 6*

Description

REV_C06_22

Usage

```
REV_C06_22
```

Format

A data.frame with 27 rows and 2 columns

REV_C06_23 *Review Exercise 23 of Chapter 6*

Description

REV_C06_23

Usage

```
REV_C06_23
```

Format

A data.frame with 28 rows and 2 columns

REV_C06_28 *Review Exercise 28 of Chapter 6*

Description

REV_C06_28

Usage

```
REV_C06_28
```

Format

A data.frame with 110 rows and 2 columns

REV_C07_18 *Review Exercise 18 of Chapter 7*

Description

REV_C07_18

Usage

```
REV_C07_18
```

Format

A data.frame with 107 rows and 3 columns

REV_C07_19 *Review Exercise 19 of Chapter 7*

Description

REV_C07_19

Usage

```
REV_C07_19
```

Format

A data.frame with 107 rows and 3 columns

REV_C07_22 *Review Exercise 22 of Chapter 7*

Description

REV_C07_22

Usage

```
REV_C07_22
```

Format

A data.frame with 76 rows and 2 columns

REV_C07_24 *Review Exercise 24 of Chapter 7*

Description

REV_C07_24

Usage

REV_C07_24

Format

A data.frame with 37 rows and 2 columns

REV_C07_29 *Review Exercise 29 of Chapter 7*

Description

REV_C07_29

Usage

REV_C07_29

Format

A data.frame with 12 rows and 2 columns

REV_C07_40 *Review Exercise 40 of Chapter 7*

Description

REV_C07_40

Usage

REV_C07_40

Format

A data.frame with 8 rows and 3 columns

REV_C07_41 *Review Exercise 41 of Chapter 7*

Description

REV_C07_41

Usage

```
REV_C07_41
```

Format

A data.frame with 11 rows and 3 columns

REV_C07_42 *Review Exercise 42 of Chapter 7*

Description

REV_C07_42

Usage

```
REV_C07_42
```

Format

A data.frame with 10 rows and 6 columns

REV_C07_43 *Review Exercise 43 of Chapter 7*

Description

REV_C07_43

Usage

```
REV_C07_43
```

Format

A data.frame with 31 rows and 2 columns

REV_C07_44 *Review Exercise 44 of Chapter 7*

Description

REV_C07_44

Usage

REV_C07_44

Format

A data.frame with 98 rows and 4 columns

REV_C07_45 *Review Exercise 45 of Chapter 7*

Description

REV_C07_45

Usage

REV_C07_45

Format

A data.frame with 15 rows and 11 columns

REV_C07_46 *Review Exercise 46 of Chapter 7*

Description

REV_C07_46

Usage

REV_C07_46

Format

A data.frame with 17 rows and 2 columns

REV_C07_47 *Review Exercise 47 of Chapter 7*

Description

REV_C07_47

Usage

```
REV_C07_47
```

Format

A data.frame with 66 rows and 2 columns

REV_C07_48 *Review Exercise 48 of Chapter 7*

Description

REV_C07_48

Usage

```
REV_C07_48
```

Format

A data.frame with 51 rows and 2 columns

REV_C07_49 *Review Exercise 49 of Chapter 7*

Description

REV_C07_49

Usage

```
REV_C07_49
```

Format

A data.frame with 22 rows and 2 columns

REV_C07_50 *Review Exercise 50 of Chapter 7*

Description

REV_C07_50

Usage

REV_C07_50

Format

A data.frame with 28 rows and 4 columns

REV_C07_51 *Review Exercise 51 of Chapter 7*

Description

REV_C07_51

Usage

REV_C07_51

Format

A data.frame with 22 rows and 2 columns

REV_C07_52 *Review Exercise 52 of Chapter 7*

Description

REV_C07_52

Usage

REV_C07_52

Format

A data.frame with 24 rows and 2 columns

REV_C07_53 *Review Exercise 53 of Chapter 7*

Description

REV_C07_53

Usage

```
REV_C07_53
```

Format

A data.frame with 55 rows and 2 columns

REV_C07_54 *Review Exercise 54 of Chapter 7*

Description

REV_C07_54

Usage

```
REV_C07_54
```

Format

A data.frame with 17 rows and 2 columns

REV_C07_55 *Review Exercise 55 of Chapter 7*

Description

REV_C07_55

Usage

```
REV_C07_55
```

Format

A data.frame with 50 rows and 2 columns

REV_C08_13 *Review Exercise 13 of Chapter 8*

Description

REV_C08_13

Usage

```
REV_C08_13
```

Format

A data.frame with 75 rows and 2 columns

REV_C08_14 *Review Exercise 14 of Chapter 8*

Description

REV_C08_14

Usage

```
REV_C08_14
```

Format

A data.frame with 91 rows and 2 columns

REV_C08_15 *Review Exercise 15 of Chapter 8*

Description

REV_C08_15

Usage

```
REV_C08_15
```

Format

A data.frame with 48 rows and 3 columns

REV_C08_16 *Review Exercise 16 of Chapter 8*

Description

REV_C08_16

Usage

```
REV_C08_16
```

Format

A data.frame with 36 rows and 3 columns

REV_C08_17 *Review Exercise 17 of Chapter 8*

Description

REV_C08_17

Usage

```
REV_C08_17
```

Format

A data.frame with 52 rows and 3 columns

REV_C08_18 *Review Exercise 18 of Chapter 8*

Description

REV_C08_18

Usage

```
REV_C08_18
```

Format

A data.frame with 74 rows and 4 columns

REV_C08_19 *Review Exercise 19 of Chapter 8*

Description

REV_C08_19

Usage

```
REV_C08_19
```

Format

A data.frame with 162 rows and 3 columns

REV_C08_20 *Review Exercise 20 of Chapter 8*

Description

REV_C08_20

Usage

```
REV_C08_20
```

Format

A data.frame with 56 rows and 2 columns

REV_C08_21 *Review Exercise 21 of Chapter 8*

Description

REV_C08_21

Usage

```
REV_C08_21
```

Format

A data.frame with 30 rows and 3 columns

REV_C08_22 *Review Exercise 22 of Chapter 8*

Description

REV_C08_22

Usage

```
REV_C08_22
```

Format

A data.frame with 54 rows and 3 columns

REV_C08_23 *Review Exercise 23 of Chapter 8*

Description

REV_C08_23

Usage

```
REV_C08_23
```

Format

A data.frame with 31 rows and 2 columns

REV_C08_24 *Review Exercise 24 of Chapter 8*

Description

REV_C08_24

Usage

```
REV_C08_24
```

Format

A data.frame with 30 rows and 3 columns

REV_C08_25 *Review Exercise 25 of Chapter 8*

Description

REV_C08_25

Usage

```
REV_C08_25
```

Format

A data.frame with 60 rows and 3 columns

REV_C08_31 *Review Exercise 31 of Chapter 8*

Description

REV_C08_31

Usage

```
REV_C08_31
```

Format

A data.frame with 28 rows and 1 columns

REV_C08_32 *Review Exercise 32 of Chapter 8*

Description

REV_C08_32

Usage

```
REV_C08_32
```

Format

A data.frame with 48 rows and 1 columns

REV_C08_33 *Review Exercise 33 of Chapter 8*

Description

REV_C08_33

Usage

REV_C08_33

Format

A data.frame with 25 rows and 2 columns

REV_C08_39 *Review Exercise 39 of Chapter 8*

Description

REV_C08_39

Usage

REV_C08_39

Format

A data.frame with 18 rows and 10 columns

REV_C08_40 *Review Exercise 40 of Chapter 8*

Description

REV_C08_40

Usage

REV_C08_40

Format

A data.frame with 30 rows and 3 columns

REV_C08_41 *Review Exercise 41 of Chapter 8*

Description

REV_C08_41

Usage

```
REV_C08_41
```

Format

A data.frame with 24 rows and 2 columns

REV_C08_42 *Review Exercise 42 of Chapter 8*

Description

REV_C08_42

Usage

```
REV_C08_42
```

Format

A data.frame with 14 rows and 8 columns

REV_C08_43 *Review Exercise 43 of Chapter 8*

Description

REV_C08_43

Usage

```
REV_C08_43
```

Format

A data.frame with 24 rows and 5 columns

REV_C08_44 *Review Exercise 44 of Chapter 8*

Description

REV_C08_44

Usage

```
REV_C08_44
```

Format

A data.frame with 16 rows and 14 columns

REV_C08_45 *Review Exercise 45 of Chapter 8*

Description

REV_C08_45

Usage

```
REV_C08_45
```

Format

A data.frame with 90 rows and 2 columns

REV_C08_46 *Review Exercise 46 of Chapter 8*

Description

REV_C08_46

Usage

```
REV_C08_46
```

Format

A data.frame with 20 rows and 5 columns

REV_C08_47 *Review Exercise 47 of Chapter 8*

Description

REV_C08_47

Usage

```
REV_C08_47
```

Format

A data.frame with 18 rows and 3 columns

REV_C08_48 *Review Exercise 48 of Chapter 8*

Description

REV_C08_48

Usage

```
REV_C08_48
```

Format

A data.frame with 34 rows and 2 columns

REV_C08_49 *Review Exercise 49 of Chapter 8*

Description

REV_C08_49

Usage

```
REV_C08_49
```

Format

A data.frame with 24 rows and 3 columns

REV_C08_50 *Review Exercise 50 of Chapter 8*

Description

REV_C08_50

Usage

```
REV_C08_50
```

Format

A data.frame with 20 rows and 5 columns

REV_C08_51 *Review Exercise 51 of Chapter 8*

Description

REV_C08_51

Usage

```
REV_C08_51
```

Format

A data.frame with 36 rows and 3 columns

REV_C08_52 *Review Exercise 52 of Chapter 8*

Description

REV_C08_52

Usage

```
REV_C08_52
```

Format

A data.frame with 65 rows and 2 columns

REV_C08_53 *Review Exercise 53 of Chapter 8*

Description

REV_C08_53

Usage

```
REV_C08_53
```

Format

A data.frame with 11 rows and 2 columns

REV_C08_54 *Review Exercise 54 of Chapter 8*

Description

REV_C08_54

Usage

```
REV_C08_54
```

Format

A data.frame with 22 rows and 8 columns

REV_C08_55 *Review Exercise 55 of Chapter 8*

Description

REV_C08_55

Usage

```
REV_C08_55
```

Format

A data.frame with 41 rows and 2 columns

REV_C08_56 *Review Exercise 56 of Chapter 8*

Description

REV_C08_56

Usage

```
REV_C08_56
```

Format

A data.frame with 14 rows and 8 columns

REV_C08_57 *Review Exercise 57 of Chapter 8*

Description

REV_C08_57

Usage

```
REV_C08_57
```

Format

A data.frame with 119 rows and 2 columns

REV_C08_58 *Review Exercise 58 of Chapter 8*

Description

REV_C08_58

Usage

```
REV_C08_58
```

Format

A data.frame with 173 rows and 2 columns

REV_C08_59 *Review Exercise 59 of Chapter 8*

Description

REV_C08_59

Usage

```
REV_C08_59
```

Format

A data.frame with 192 rows and 2 columns

REV_C08_60 *Review Exercise 60 of Chapter 8*

Description

REV_C08_60

Usage

```
REV_C08_60
```

Format

A data.frame with 24 rows and 2 columns

REV_C08_61 *Review Exercise 61 of Chapter 8*

Description

REV_C08_61

Usage

```
REV_C08_61
```

Format

A data.frame with 32 rows and 2 columns

REV_C08_62 *Review Exercise 62 of Chapter 8*

Description

REV_C08_62

Usage

```
REV_C08_62
```

Format

A data.frame with 14 rows and 12 columns

REV_C08_63 *Review Exercise 63 of Chapter 8*

Description

REV_C08_63

Usage

```
REV_C08_63
```

Format

A data.frame with 30 rows and 2 columns

REV_C08_64 *Review Exercise 64 of Chapter 8*

Description

REV_C08_64

Usage

```
REV_C08_64
```

Format

A data.frame with 60 rows and 2 columns

REV_C08_65 *Review Exercise 65 of Chapter 8*

Description

REV_C08_65

Usage

```
REV_C08_65
```

Format

A data.frame with 20 rows and 2 columns

REV_C08_66 *Review Exercise 66 of Chapter 8*

Description

REV_C08_66

Usage

```
REV_C08_66
```

Format

A data.frame with 15 rows and 2 columns

REV_C09_16 *Review Exercise 16 of Chapter 9*

Description

REV_C09_16

Usage

```
REV_C09_16
```

Format

A data.frame with 29 rows and 2 columns

REV_C09_17 *Review Exercise 17 of Chapter 9*

Description

`REV_C09_17`

Usage

```
REV_C09_17
```

Format

A data.frame with 89 rows and 2 columns

REV_C09_18 *Review Exercise 18 of Chapter 9*

Description

`REV_C09_18`

Usage

```
REV_C09_18
```

Format

A data.frame with 31 rows and 5 columns

REV_C09_19 *Review Exercise 19 of Chapter 9*

Description

`REV_C09_19`

Usage

```
REV_C09_19
```

Format

A data.frame with 19 rows and 2 columns

REV_C09_20 *Review Exercise 20 of Chapter 9*

Description

REV_C09_20

Usage

```
REV_C09_20
```

Format

A data.frame with 16 rows and 2 columns

REV_C09_21 *Review Exercise 21 of Chapter 9*

Description

REV_C09_21

Usage

```
REV_C09_21
```

Format

A data.frame with 15 rows and 2 columns

REV_C09_22 *Review Exercise 22 of Chapter 9*

Description

REV_C09_22

Usage

```
REV_C09_22
```

Format

A data.frame with 12 rows and 2 columns

REV_C09_23 *Review Exercise 23 of Chapter 9*

Description

REV_C09_23

Usage

```
REV_C09_23
```

Format

A data.frame with 16 rows and 2 columns

REV_C09_24 *Review Exercise 24 of Chapter 9*

Description

REV_C09_24

Usage

```
REV_C09_24
```

Format

A data.frame with 20 rows and 2 columns

REV_C09_25 *Review Exercise 25 of Chapter 9*

Description

REV_C09_25

Usage

```
REV_C09_25
```

Format

A data.frame with 10 rows and 2 columns

REV_C09_29 *Review Exercise 29 of Chapter 9*

Description

REV_C09_29

Usage

```
REV_C09_29
```

Format

A data.frame with 85 rows and 2 columns

REV_C09_30 *Review Exercise 30 of Chapter 9*

Description

REV_C09_30

Usage

```
REV_C09_30
```

Format

A data.frame with 27 rows and 2 columns

REV_C09_31 *Review Exercise 31 of Chapter 9*

Description

REV_C09_31

Usage

```
REV_C09_31
```

Format

A data.frame with 25 rows and 2 columns

REV_C09_32 *Review Exercise 32 of Chapter 9*

Description

`REV_C09_32`

Usage

`REV_C09_32`

Format

A data.frame with 9 rows and 3 columns

REV_C09_33 *Review Exercise 33 of Chapter 9*

Description

`REV_C09_33`

Usage

`REV_C09_33`

Format

A data.frame with 25 rows and 2 columns

REV_C09_34 *Review Exercise 34 of Chapter 9*

Description

`REV_C09_34`

Usage

`REV_C09_34`

Format

A data.frame with 19 rows and 5 columns

REV_C09_35 *Review Exercise 35 of Chapter 9*

Description

REV_C09_35

Usage

```
REV_C09_35
```

Format

A data.frame with 62 rows and 2 columns

REV_C09_36 *Review Exercise 36 of Chapter 9*

Description

REV_C09_36

Usage

```
REV_C09_36
```

Format

A data.frame with 23 rows and 2 columns

REV_C09_37 *Review Exercise 37 of Chapter 9*

Description

REV_C09_37

Usage

```
REV_C09_37
```

Format

A data.frame with 23 rows and 2 columns

REV_C09_38 *Review Exercise 38 of Chapter 9*

Description

REV_C09_38

Usage

```
REV_C09_38
```

Format

A data.frame with 32 rows and 2 columns

REV_C09_39 *Review Exercise 39 of Chapter 9*

Description

REV_C09_39

Usage

```
REV_C09_39
```

Format

A data.frame with 48 rows and 5 columns

REV_C09_40 *Review Exercise 40 of Chapter 9*

Description

REV_C09_40

Usage

```
REV_C09_40
```

Format

A data.frame with 13 rows and 2 columns

REV_C09_41 *Review Exercise 41 of Chapter 9*

Description

REV_C09_41

Usage

```
REV_C09_41
```

Format

A data.frame with 66 rows and 2 columns

REV_C09_42 *Review Exercise 42 of Chapter 9*

Description

REV_C09_42

Usage

```
REV_C09_42
```

Format

A data.frame with 102 rows and 7 columns

REV_C09_43 *Review Exercise 43 of Chapter 9*

Description

REV_C09_43

Usage

```
REV_C09_43
```

Format

A data.frame with 14 rows and 4 columns

REV_C09_44 *Review Exercise 44 of Chapter 9*

Description

REV_C09_44

Usage

```
REV_C09_44
```

Format

A data.frame with 44 rows and 2 columns

REV_C09_45 *Review Exercise 45 of Chapter 9*

Description

REV_C09_45

Usage

```
REV_C09_45
```

Format

A data.frame with 172 rows and 2 columns

REV_C09_46 *Review Exercise 46 of Chapter 9*

Description

REV_C09_46

Usage

```
REV_C09_46
```

Format

A data.frame with 33 rows and 4 columns

REV_C10_06 *Review Exercise 6 of Chapter 10*

Description

REV_C10_06

Usage

```
REV_C10_06
```

Format

A data.frame with 114 rows and 3 columns

REV_C10_07 *Review Exercise 7 of Chapter 10*

Description

REV_C10_07

Usage

```
REV_C10_07
```

Format

A data.frame with 15 rows and 3 columns

REV_C10_08 *Review Exercise 8 of Chapter 10*

Description

REV_C10_08

Usage

```
REV_C10_08
```

Format

A data.frame with 20 rows and 4 columns

REV_C10_09 *Review Exercise 9 of Chapter 10*

Description

REV_C10_09

Usage

```
REV_C10_09
```

Format

A data.frame with 15 rows and 3 columns

REV_C10_10 *Review Exercise 10 of Chapter 10*

Description

REV_C10_10

Usage

```
REV_C10_10
```

Format

A data.frame with 21 rows and 3 columns

REV_C10_11 *Review Exercise 11 of Chapter 10*

Description

REV_C10_11

Usage

```
REV_C10_11
```

Format

A data.frame with 15 rows and 5 columns

REV_C10_17 *Review Exercise 17 of Chapter 10*

Description

REV_C10_17

Usage

```
REV_C10_17
```

Format

A data.frame with 26 rows and 13 columns

REV_C10_18 *Review Exercise 18 of Chapter 10*

Description

REV_C10_18

Usage

```
REV_C10_18
```

Format

A data.frame with 34 rows and 7 columns

REV_C10_19 *Review Exercise 19 of Chapter 10*

Description

REV_C10_19

Usage

```
REV_C10_19
```

Format

A data.frame with 96 rows and 8 columns

REV_C11_14 *Review Exercise 14 of Chapter 11*

Description

REV_C11_14

Usage

```
REV_C11_14
```

Format

A data.frame with 70 rows and 5 columns

REV_C11_15 *Review Exercise 15 of Chapter 11*

Description

REV_C11_15

Usage

```
REV_C11_15
```

Format

A data.frame with 28 rows and 3 columns

REV_C11_16 *Review Exercise 16 of Chapter 11*

Description

REV_C11_16

Usage

```
REV_C11_16
```

Format

A data.frame with 27 rows and 3 columns

REV_C11_17 *Review Exercise 17 of Chapter 11*

Description

REV_C11_17

Usage

REV_C11_17

Format

A data.frame with 40 rows and 3 columns

REV_C11_18 *Review Exercise 18 of Chapter 11*

Description

REV_C11_18

Usage

REV_C11_18

Format

A data.frame with 31 rows and 4 columns

REV_C11_22 *Review Exercise 22 of Chapter 11*

Description

REV_C11_22

Usage

REV_C11_22

Format

A data.frame with 12 rows and 3 columns

REV_C11_23 *Review Exercise 23 of Chapter 11*

Description

`REV_C11_23`

Usage

```
REV_C11_23
```

Format

A data.frame with 47 rows and 3 columns

REV_C11_24 *Review Exercise 24 of Chapter 11*

Description

`REV_C11_24`

Usage

```
REV_C11_24
```

Format

A data.frame with 129 rows and 3 columns

REV_C11_25 *Review Exercise 25 of Chapter 11*

Description

`REV_C11_25`

Usage

```
REV_C11_25
```

Format

A data.frame with 30 rows and 3 columns

REV_C11_26 *Review Exercise 26 of Chapter 11*

Description

REV_C11_26

Usage

```
REV_C11_26
```

Format

A data.frame with 18 rows and 3 columns

REV_C11_27 *Review Exercise 27 of Chapter 11*

Description

REV_C11_27

Usage

```
REV_C11_27
```

Format

A data.frame with 37 rows and 3 columns

REV_C11_28 *Review Exercise 28 of Chapter 11*

Description

REV_C11_28

Usage

```
REV_C11_28
```

Format

A data.frame with 41 rows and 10 columns

REV_C11_29 *Review Exercise 29 of Chapter 11*

Description

REV_C11_29

Usage

```
REV_C11_29
```

Format

A data.frame with 19 rows and 9 columns

REV_C13_06 *Review Exercise 6 of Chapter 13*

Description

REV_C13_06

Usage

```
REV_C13_06
```

Format

A data.frame with 20 rows and 2 columns

REV_C13_08 *Review Exercise 8 of Chapter 13*

Description

REV_C13_08

Usage

```
REV_C13_08
```

Format

A data.frame with 303 rows and 2 columns

REV_C13_09 *Review Exercise 9 of Chapter 13*

Description

REV_C13_09

Usage

```
REV_C13_09
```

Format

A data.frame with 10 rows and 4 columns

REV_C13_10 *Review Exercise 10 of Chapter 13*

Description

REV_C13_10

Usage

```
REV_C13_10
```

Format

A data.frame with 34 rows and 2 columns

REV_C13_13 *Review Exercise 13 of Chapter 13*

Description

REV_C13_13

Usage

```
REV_C13_13
```

Format

A data.frame with 70 rows and 2 columns

REV_C13_15 *Review Exercise 15 of Chapter 13*

Description

`REV_C13_15`

Usage

`REV_C13_15`

Format

A data.frame with 12 rows and 2 columns

REV_C13_16 *Review Exercise 16 of Chapter 13*

Description

`REV_C13_16`

Usage

`REV_C13_16`

Format

A data.frame with 43 rows and 5 columns

REV_C13_17 *Review Exercise 17 of Chapter 13*

Description

`REV_C13_17`

Usage

`REV_C13_17`

Format

A data.frame with 67 rows and 2 columns

REV_C13_18 *Review Exercise 18 of Chapter 13*

Description

REV_C13_18

Usage

```
REV_C13_18
```

Format

A data.frame with 18 rows and 3 columns

REV_C13_19 *Review Exercise 19 of Chapter 13*

Description

REV_C13_19

Usage

```
REV_C13_19
```

Format

A data.frame with 50 rows and 2 columns

REV_C13_20 *Review Exercise 20 of Chapter 13*

Description

REV_C13_20

Usage

```
REV_C13_20
```

Format

A data.frame with 31 rows and 3 columns

REV_C13_21 *Review Exercise 21 of Chapter 13*

Description

REV_C13_21

Usage

```
REV_C13_21
```

Format

A data.frame with 45 rows and 3 columns

REV_C13_22 *Review Exercise 22 of Chapter 13*

Description

REV_C13_22

Usage

```
REV_C13_22
```

Format

A data.frame with 18 rows and 2 columns

REV_C13_23 *Review Exercise 23 of Chapter 13*

Description

REV_C13_23

Usage

```
REV_C13_23
```

Format

A data.frame with 44 rows and 5 columns

REV_C13_24 *Review Exercise 24 of Chapter 13*

Description

REV_C13_24

Usage

```
REV_C13_24
```

Format

A data.frame with 20 rows and 6 columns

REV_C13_25 *Review Exercise 25 of Chapter 13*

Description

REV_C13_25

Usage

```
REV_C13_25
```

Format

A data.frame with 20 rows and 3 columns

REV_C13_26 *Review Exercise 26 of Chapter 13*

Description

REV_C13_26

Usage

```
REV_C13_26
```

Format

A data.frame with 18 rows and 3 columns

REV_C13_27 *Review Exercise 27 of Chapter 13*

Description

REV_C13_27

Usage

REV_C13_27

Format

A data.frame with 9 rows and 6 columns

REV_C13_28 *Review Exercise 28 of Chapter 13*

Description

REV_C13_28

Usage

REV_C13_28

Format

A data.frame with 31 rows and 2 columns

REV_C13_29 *Review Exercise 29 of Chapter 13*

Description

REV_C13_29

Usage

REV_C13_29

Format

A data.frame with 17 rows and 2 columns

REV_C14_11 *Review Exercise 11 of Chapter 14*

Description

REV_C14_11

Usage

```
REV_C14_11
```

Format

A data.frame with 55 rows and 4 columns

REV_C14_12 *Review Exercise 12 of Chapter 14*

Description

REV_C14_12

Usage

```
REV_C14_12
```

Format

A data.frame with 77 rows and 4 columns

show,BooleanRisk-method *Show BooleanRisk Object*

Description

Show BooleanRisk object

Usage

```
## S4 method for signature 'BooleanRisk'
show(object)
```

Arguments

object a BooleanRisk object

Value

The show method for BooleanRisk object does not have a returned value.

---

show,BooleanTest-method *Show BooleanTest Object*

Description

Show BooleanTest object

Usage

```
## S4 method for signature 'BooleanTest'
show(object)
```

Arguments

object a BooleanTest object

Value

The show method for BooleanTest object does not have a returned value.

---

show,freqs-method *Show freqs Object*

Description

Show freqs object

Usage

```
## S4 method for signature 'freqs'
show(object)
```

Arguments

object an freqs object

Value

The show method for freqs object does not have a returned value.

`show,power-method` *Show power Object*

Description

Show power object

Usage

```
## S4 method for signature 'power'
show(object)
```

Arguments

`object`	a power object

Value

The show method for power object does not have a returned value.

Index