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Description An educational toolkit for learning statistical concepts through interactive exploration. Provides functions for basic statistics (mean, variance, etc.) and probability distributions with step-by-step explanations and interactive learning modes. Each function can be used for simple calculations, detailed learning with explanations, or interactive practice with feedback.

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absolute_acum_frequency
<i>Absolute Accumulated Frequency Function</i>

Description

This function calculates the absolute accumulated frequency of a value in a numeric vector.

Usage

absolute_acum_frequency(v = NULL, x = NULL, learn = FALSE, interactive = FALSE)

Arguments

- | | |
|-------------|---|
| v | Optional numeric vector (not needed for interactive mode) |
| x | Optional numeric value to count (not needed for interactive mode) |
| learn | Logical, if TRUE shows step-by-step explanation |
| interactive | Logical, if TRUE enables interactive practice mode |

Value

The absolute accumulated frequency of x in v (for non-interactive mode)

Examples

```
data <- c(1,4,3,3,2,5,7,12,1,2,3,12)
value <- 12

# Simple calculation
absolute_acum_frequency(data, value)

# Learning mode
absolute_acum_frequency(data, value, learn = TRUE)

# Interactive mode
if(interactive()){
  absolute_acum_frequency(interactive = TRUE)
}
```

absolute_frequency	<i>Absolute Frequency Function</i>
--------------------	------------------------------------

Description

This function calculates the absolute frequency of a value in a numeric vector.

Usage

```
absolute_frequency(v = NULL, x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

v	Optional numeric vector (not needed for interactive mode)
x	Optional numeric value to count (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The absolute frequency of x in v (for non-interactive mode)

Examples

```
data <- c(1,4,3,3,2,5,7,12,1,2,3,12)
value <- 12

# Simple calculation
absolute_frequency(data, value)

# Learning mode
absolute_frequency(data, value, learn = TRUE)

# Interactive mode
if(interactive()){
  absolute_frequency(interactive = TRUE)
}
```

average_deviation	<i>Average Absolute Deviation Function</i>
-------------------	--

Description

This function calculates the average absolute deviation of a numbers vector.

Usage

```
average_deviation(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The average absolute deviation of the vector (for non-interactive mode)

Examples

```
data <- c(7,2,5,7,1,4,12)

# Simple calculation
average_deviation(data)

# Learning mode
average_deviation(data, learn = TRUE)

# Interactive mode
```

```
if(interactive()){  
  average_deviation(interactive = TRUE)  
}
```

`binomial_`*Binomial Distribution Function*

Description

This function calculates the binomial distribution probability.

Usage

```
binomial_(n = NULL, x = NULL, p = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

<code>n</code>	Optional number of trials (not needed for interactive mode)
<code>x</code>	Optional number of successes (not needed for interactive mode)
<code>p</code>	Optional probability of success (not needed for interactive mode)
<code>learn</code>	Logical, if TRUE shows step-by-step explanation
<code>interactive</code>	Logical, if TRUE enables interactive practice mode

Value

The binomial probability (for non-interactive mode)

Examples

```
n <- 3  
x <- 2  
p <- 0.7  
  
# Simple calculation  
binomial_(n, x, p)  
  
# Learning mode  
binomial_(n, x, p, learn = TRUE)  
  
# Interactive mode  
if(interactive()){  
  binomial_(interactive = TRUE)  
}
```

chisquared	<i>Chi-squared Distribution Function</i>
------------	--

Description

This function calculates the chi-squared statistic between two groups.

Usage

```
chisquared(x = NULL, y = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional first vector (not needed for interactive mode)
y	Optional second vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The chi-squared statistic (for non-interactive mode)

Examples

```
x <- c(70,75,74,72,68,59)
y <- c(74,77,70,80,72,76)

# Simple calculation
chisquared(x, y)

# Learning mode
chisquared(x, y, learn = TRUE)

# Interactive mode
if(interactive()){
  chisquared(interactive = TRUE)
}
```

covariance	<i>Covariance Function</i>
------------	----------------------------

Description

This function calculates the covariance between two vectors of numbers.

Usage

```
covariance(x = NULL, y = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional first numeric vector (not needed for interactive mode)
y	Optional second numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The covariance between the two vectors (for non-interactive mode)

Examples

```
data <- c(10,4,5,7,3,4,1)
data2 <- c(1,8,3,4,4,5,7)

# Simple calculation
covariance(data, data2)

# Learning mode
covariance(data, data2, learn = TRUE)

# Interactive mode
if(interactive()){
  covariance(interactive = TRUE)
}
```

cv	<i>Coefficient of Variation Function</i>
----	--

Description

This function calculates the coefficient of variation of a numbers vector.

Usage

```
cv(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The coefficient of variation of the vector (for non-interactive mode)

Examples

```
data <- c(10,4,5,7,3,4,1)

# Simple calculation
cv(data)

# Learning mode
cv(data, learn = TRUE)

# Interactive mode
if(interactive()){
  cv(interactive = TRUE)
}
```

drawVector	<i>Draw Vector Function</i>
------------	-----------------------------

Description

This function prints all the elements of a vector

Usage

```
drawVector(buffer)
```


Arguments

buffer A vector of elements to be printed

Value

No return value, prints to screen

Examples

```
## Not run:
data <- c(1:12)
drawVector(data)

## End(Not run)
```

fisher

Fisher's F Distribution Function

Description

This function calculates the F statistic between two groups.

Usage

```
fisher(x = NULL, y = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x Optional first vector (not needed for interactive mode)
y Optional second vector (not needed for interactive mode)
learn Logical, if TRUE shows step-by-step explanation
interactive Logical, if TRUE enables interactive practice mode

Value

The F statistic (for non-interactive mode)

Examples

```
x <- c(70,75,74,72,68,59)
y <- c(74,77,70,80,72,76)

# Simple calculation
fisher(x, y)

# Learning mode
fisher(x, y, learn = TRUE)
```

```
# Interactive mode
if(interactive()){
  fisher(interactive = TRUE)
}
```

geometric_mean

Geometric Mean Function

Description

This function calculates the geometric mean of a numeric vector. Can be used in three modes: simple calculation, learning mode with step-by-step explanation, or interactive mode for practice.

Usage

```
geometric_mean(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The geometric mean of the vector (for non-interactive mode)

Examples

```
data <- c(5,21,12,7,3,9,1)
# Simple calculation
geometric_mean(data)

# Learning mode
geometric_mean(data, learn = TRUE)

# Interactive mode
if(interactive()){
  geometric_mean(interactive = TRUE)
}
```

getUserAction	<i>Get User Action Function</i>
---------------	---------------------------------

Description

This function gets the buffer introduced by the user. Typically a numerical vector.

Usage

```
getUserAction()
```

Value

A vector entered by the user

Examples

```
## Not run:  
vector <- getUserAction()  
  
## End(Not run)
```

harmonic_mean	<i>Harmonic Mean Function</i>
---------------	-------------------------------

Description

This function calculates the harmonic mean of a numbers vector.

Usage

```
harmonic_mean(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The harmonic mean of the vector (for non-interactive mode)

Examples

```
data <- c(1,4,3,3,2,5,7,12,1,2,3,12)

# Simple calculation
harmonic_mean(data)

# Learning mode
harmonic_mean(data, learn = TRUE)

# Interactive mode
if(interactive()){
  harmonic_mean(interactive = TRUE)
}
```

initImages	<i>Initialize Images Function</i>
------------	-----------------------------------

Description

This function displays an image from the package resources.

Usage

```
initImages(image_name)
```

Arguments

image_name	Name of the image file in inst/images
------------	---------------------------------------

Value

No return value

laplace	<i>Laplace's Rule Function</i>
---------	--------------------------------

Description

This function calculates Laplace's Rule for a probability experiment.

Usage

```
laplace(x = NULL, y = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional first vector (not needed for interactive mode)
y	Optional second vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The probability according to Laplace's Rule (for non-interactive mode)

Examples

```
data <- 3
data2 <- c(1,2,3,4,5,6)

# Simple calculation
laplace(data, data2)

# Learning mode
laplace(data, data2, learn = TRUE)

# Interactive mode
if(interactive()){
  laplace(interactive = TRUE)
}
```

mean_

Statistical Mean Function

Description

This function calculates the arithmetic mean of a numeric vector. Can be used in three modes: simple calculation, learning mode with step-by-step explanation, or interactive mode for practice.

Usage

```
mean_(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The arithmetic mean of the vector

Examples

```
# Simple calculation
data <- c(1,2,2,5,10,4,2)
mean_(data)

# Learning mode
mean_(data, learn = TRUE)

# Interactive mode
if(interactive()){
  mean_(interactive = TRUE)
}
```

median_

*Median Function***Description**

This function calculates the median of a numbers vector.

Usage

```
median_(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The median of the vector (for non-interactive mode)

Examples

```
data <- c(1,3,2,5,12,4,4,2,9)

# Simple calculation
median_(data)

# Learning mode
median_(data, learn = TRUE)

# Interactive mode
if(interactive()){
  median_(interactive = TRUE)
}
```

mode_	<i>Mode Function</i>
-------	----------------------

Description

This function calculates the mode of a numbers vector.

Usage

```
mode_(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The mode of the vector (for non-interactive mode)

Examples

```
data <- c(5,21,12,7,3,9,1)

# Simple calculation
mode_(data)

# Learning mode
mode_(data, learn = TRUE)

# Interactive mode
if(interactive()){
  mode_(interactive = TRUE)
}
```

normal	<i>Normal Distribution Function</i>
--------	-------------------------------------

Description

This function calculates the normal distribution probability density.

Usage

```
normal(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric value (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The normal probability density (for non-interactive mode)

Examples

```
x <- 0.1

# Simple calculation
normal(x)

# Learning mode
normal(x, learn = TRUE)

# Interactive mode
if(interactive()){
  normal(interactive = TRUE)
}
```

pearson

Pearson Correlation Function

Description

This function calculates the Pearson correlation coefficient between two vectors of numbers.

Usage

```
pearson(x = NULL, y = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional first numeric vector (not needed for interactive mode)
y	Optional second numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The Pearson correlation coefficient between the two vectors (for non-interactive mode)

Examples

```
data <- c(10,4,5,7,3,4,1)
data2 <- c(1,8,3,4,4,5,7)

# Simple calculation
pearson(data, data2)

# Learning mode
pearson(data, data2, learn = TRUE)

# Interactive mode
if(interactive()){
  pearson(interactive = TRUE)
}
```

percentile

Percentile Function

Description

This function calculates the percentiles of a numeric vector.

Usage

```
percentile(x = NULL, p = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
p	Numeric value between 0 and 1 for percentile calculation (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The percentile value (for non-interactive mode)

Examples

```
data <- c(1,4,3,3,2,5,7,12)

# Simple calculation
percentile(data, 0.3)

percentile(data, 0.3, learn = TRUE)
```

```
if(interactive()){  
  percentile(interactive = TRUE)  
}
```

poisson_

Poisson Distribution Function

Description

This function calculates the Poisson distribution probability.

Usage

```
poisson_(k = NULL, lam = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

k	Optional number of occurrences (not needed for interactive mode)
lam	Optional expected value lambda (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The Poisson probability (for non-interactive mode)

Examples

```
lam <- 2  
k <- 3  
  
# Simple calculation  
poisson_(k, lam)  
  
# Learning mode  
poisson_(k, lam, learn = TRUE)  
  
# Interactive mode  
if(interactive()){  
  poisson_(interactive = TRUE)  
}
```

quartile

Quartiles Function

Description

This function calculates the quartiles of a numeric vector.

Usage

```
quartile(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The quartiles of the vector (for non-interactive mode)

Examples

```
data <- c(1,2,2,5,10,4,2)

# Simple calculation
quartile(data)

# Learning mode
quartile(data, learn = TRUE)

# Interactive mode
if(interactive()){
  quartile(interactive = TRUE)
}
```

relative_acum_frequency

Relative Accumulated Frequency Function

Description

This function calculates the relative accumulated frequency of a value in a numeric vector.

Usage

```
relative_acum_frequency(v = NULL, x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

v	Optional numeric vector (not needed for interactive mode)
x	Optional numeric value to count (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The relative accumulated frequency of x in v (for non-interactive mode)

Examples

```
data <- c(1,4,3,3,2,5,7,12,1,2,3,12)
value <- 12

# Simple calculation
relative_acum_frequency(data, value)

# Learning mode
relative_acum_frequency(data, value, learn = TRUE)

# Interactive mode
if(interactive()){
  relative_acum_frequency(interactive = TRUE)
}
```

relative_frequency	<i>Relative Frequency Function</i>
--------------------	------------------------------------

Description

This function calculates the relative frequency of a value in a numeric vector.

Usage

```
relative_frequency(v = NULL, x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

v	Optional numeric vector (not needed for interactive mode)
x	Optional numeric value to count (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The relative frequency of x in v (for non-interactive mode)

Examples

```
data <- c(1,4,3,3,2,5,7,12,1,2,3,12)
value <- 12

# Simple calculation
relative_frequency(data, value)

# Learning mode
relative_frequency(data, value, learn = TRUE)

# Interactive mode
if(interactive()){
  relative_frequency(interactive = TRUE)
}
```

standard_deviation	<i>Standard Deviation Function</i>
--------------------	------------------------------------

Description

This function calculates the standard deviation of a numbers vector.

Usage

```
standard_deviation(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The standard deviation of the vector (for non-interactive mode)

Examples

```
data <- c(1,5,3,7,10,4,2)

# Simple calculation
standard_deviation(data)
```

```
# Learning mode
standard_deviation(data, learn = TRUE)

# Interactive mode
if(interactive()){
  standard_deviation(interactive = TRUE)
}
```

tstudent

Student's t Distribution Function

Description

This function calculates the t-statistic for sample data.

Usage

```
tstudent(
  x = NULL,
  u = NULL,
  s = NULL,
  n = NULL,
  learn = FALSE,
  interactive = FALSE
)
```

Arguments

x	Optional sample mean (not needed for interactive mode)
u	Optional population mean (not needed for interactive mode)
s	Optional standard deviation (not needed for interactive mode)
n	Optional sample size (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The t-statistic (for non-interactive mode)

Examples

```
x <- 52.9
u <- 50
s <- 3
n <- 10
```

```
# Simple calculation
tstudent(x, u, s, n)

# Learning mode
tstudent(x, u, s, n, learn = TRUE)

# Interactive mode
if(interactive()){
  tstudent(interactive = TRUE)
}
```

variance

Variance Function

Description

This function calculates the variance of a numbers vector.

Usage

```
variance(x = NULL, learn = FALSE, interactive = FALSE)
```

Arguments

x	Optional numeric vector (not needed for interactive mode)
learn	Logical, if TRUE shows step-by-step explanation
interactive	Logical, if TRUE enables interactive practice mode

Value

The variance of the vector (for non-interactive mode)

Examples

```
data <- c(10,4,5,7,3,4,1)

# Simple calculation
variance(data)

# Learning mode
variance(data, learn = TRUE)

# Interactive mode
if(interactive()){
  variance(interactive = TRUE)
}
```

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