Package 'cusumcharter'

May 8, 2026

Title Easier CUSUM Control Charts

Version 0.1.0

Description Create CUSUM (cumulative sum) statistics from a vector or dataframe. Also create single or faceted CUSUM control charts, with or without control limits. Accepts vector, dataframe, tibble or data.table inputs.

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Encoding UTF-8

RoxygenNote 7.1.2

Suggests covr, dplyr, knitr, rmarkdown, testthat (>= 3.0.0), tibble

Config/testthat/edition 3

URL https://github.com/johnmackintosh/cusumcharter, https://johnmackintosh.github.io/cusumcharter/

BugReports https://github.com/johnmackintosh/cusumcharter/issues

Imports rlang, ggplot2, data.table

VignetteBuilder knitr

NeedsCompilation no

Author John MacKintosh [aut, cre]

Maintainer John MacKintosh <johnmackintosh.jm@gmail.com>

Repository CRAN

Date/Publication 2021-11-15 08:50:02 UTC

Contents

`cusum_control` *cusum_control*

Description

cusum_control

Usage

```
cusum_control(
  x,
  target = NULL,
  std_dev = NULL,
  desired_shift = 1,
  k = 0.5,
  h = 4
)
```

Arguments

`x`	input vector
`target`	target value for comparison, the mean of x will be used if missing
`std_dev`	Defaults to the screened moving range of x. A known or desired value for standard deviation can be supplied instead.
`desired_shift`	how many standard deviations do you want to detect? This value is typically between 0.5 to 1. Defaults to 1.
`k`	allowable slack - defaults to half the standard deviation multiplied by desired shift
`h`	action limits - usually between 4 and 5, defaults to 4. The standard deviation is multiplied by this value to determine the upper and lower limits on the chart

Value

data.frame showing original inputs and calculated control limits

Examples

```
test_vec3 <- c(1,1,2,3,5,7,11,7,5,7,8,9,5)
controls <- cusum_control(test_vec3, target = 4)
```

cusum_control_median *cusum_control_median*

Description

cusum_control_median

Usage

```
cusum_control_median(
  x,
  target = NULL,
  std_dev = NULL,
  desired_shift = 1,
  k = 0.5,
  h = 4
)
```

Arguments

x	input vector
target	target value for comparison, the median of x will be used if missing
std_dev	Defaults to the screened moving range of x. A known or desired value for standard deviation can be supplied instead.
desired_shift	how many standard deviations do you want to detect? This value is typically between 0.5 to 1. Defaults to 1.
k	allowable slack - defaults to half the standard deviation multiplied by desired shift
h	action limits - usually between 4 and 5, defaults to 4. The standard deviation is multiplied by this value to determine the upper and lower limits on the chart

Value

data.frame showing original inputs and calculated control limits

Examples

```
test_vec3 <- c(1,1,2,3,5,7,11,7,5,7,8,9,5)
controls <- cusum_control_median(test_vec3, target = 4)
controls_median <- cusum_control_median(test_vec3)
```

`cusum_control_plot` *cusum_control_plot*

Description

cusum_control_plot

Usage

```
cusum_control_plot(
  df,
  xvar,
  show_below = FALSE,
  pos_col = "#385581",
  centre_col = "black",
  neg_col = "#6dbac6",
  highlight_col = "#c9052c",
  facet_var = NULL,
  facet_scales = "free_y",
  scale_type = NULL,
  datebreaks = NULL,
  title_text = NULL,
  ...
)
```

Arguments

`df`	input data frame generated by cusum_control function
`xvar`	the variable on the x axis, typically an obervation number or date/time
`show_below`	whether to highlight points below the LCL, default is FALSE
`pos_col`	line and point colour for positive values
`centre_col`	line colour for centre line
`neg_col`	line nd point colour for negative values
`highlight_col`	• point colour for values outside UCL and (optionally) LCL
`facet_var`	• the grouping variable to facet the charts by. If not supplied a non faceted plot is generated
`facet_scales`	defaults to "free_y", but any of the usual ggplot2 facet values can be supplied e.g. "fixed" or "free_x"
`scale_type`	if you need a date or datetime scale, specify either "date" or "datetime" here. Otherwise, leave as NULL and ggplot2 will pick an appropriate scale for you
`datebreaks`	a character string specifying the breaks as text e.g "2 days" or "3 weeks". See ggplot2 date_breaks for further details
`title_text`	optional title for chart
`...`	further arguments passed on to ggplot2

Value

ggplot2 object suited for further amendments if required.

Examples

```
test_vec3 <- c(1,1,2,3,5,7,11,7,5,7,8,9,5)
controls <- cusum_control(test_vec3, target = 4)
cusum_control_plot(controls, xvar = obs)
```

`cusum_single` *cusum_single*

Description

cusum_single

Usage

```
cusum_single(x, target = NULL)
```

Arguments

`x`	a numeric vector from which to calculate the cumulative sum statistics
`target`	value to compare each element of x to. If not provided, the mean of x will be calculated and used as a target value

Value

a vector of the cumulative sum statistic, centred on the target value

Examples

```
test_vec <- c(0.175, 0.152, 0.15, 0.207, 0.136, 0.212, 0.166)
cusum_single(test_vec)
```

cusum_single_df *cusum_single_df*

Description

cusum_single_df

Usage

```
cusum_single_df(x, target = NULL)
```

Arguments

x	a numeric vector from which to calculate the cumulative sum statistics
target	value to compare each element of x to. If not provided, the mean of x will be calculated and used as a target value

Value

a dataframe with the original values, target, the variance, the cumulative sum of the variance, and the cumulative sum centered on the target value. This centering is achieved by adding the target value to the cumulative sum.

Examples

```
test_vec <- c(0.175, 0.152, 0.15, 0.207, 0.136, 0.212, 0.166)
cusum_single_df(test_vec, target = 0.16)
```

cusum_single_median *cusum_single_median*

Description

cusum_single_median

Usage

```
cusum_single_median(x, target = NULL)
```

Arguments

x	a numeric vector from which to calculate the cumulative sum statistics
target	value to compare each element of x to. If not provided, the median value of x will be calculated and used as a target value

Value

a vector of the cumulative sum statistic, centred on the target value

Examples

```
test_vec <- c(0.175, 0.152, 0.15, 0.207, 0.136, 0.212, 0.166)
cusum_single_median(test_vec)
```

`cusum_single_median_df`

cusum_single_median_df

Description

cusum_single_median_df

Usage

```
cusum_single_median_df(x, target = NULL)
```

Arguments

`x`	a numeric vector from which to calculate the cumulative sum statistics
`target`	value to compare each element of x to. If not provided, the median value of x will be calculated and used as a target value

Value

a dataframe with the original values, target, the variance, the cumulative sum of the variance, and the cumulative sum centered on the target value. This centering is achieved by adding the target value to the cumulative sum.

Examples

```
test_vec <- c(0.175, 0.152, 0.15, 0.207, 0.136, 0.212, 0.166)
cusum_single_median_df(test_vec, target = 0.16)
cusum_single_median_df(test_vec)
```

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