

# Package ‘cusumcharter’

October 12, 2022

**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.

**License** GPL (>= 3)

**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

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**Repository** CRAN

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cusum_control	<i>cusum_control</i>
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### 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

<code>x</code>	input vector
<code>target</code>	target value for comparison, the median of <code>x</code> will be used if missing
<code>std_dev</code>	Defaults to the screened moving range of <code>x</code> . A known or desired value for standard deviation can be supplied instead.
<code>desired_shift</code>	how many standard deviations do you want to detect? This value is typically between 0.5 to 1. Defaults to 1.
<code>k</code>	allowable slack - defaults to half the standard deviation multiplied by desired shift
<code>h</code>	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)
```

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`cusum_control_plot`      *`cusum_control_plot`*

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## 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

<code>df</code>	input data frame generated by <code>cusum_control</code> function
<code>xvar</code>	the variable on the x axis, typically an observation number or date/time
<code>show_below</code>	whether to highlight points below the LCL, default is FALSE
<code>pos_col</code>	line and point colour for positive values
<code>centre_col</code>	line colour for centre line
<code>neg_col</code>	line and point colour for negative values
<code>highlight_col</code>	<ul style="list-style-type: none"> <li>point colour for values outside UCL and (optionally) LCL</li> </ul>
<code>facet_var</code>	<ul style="list-style-type: none"> <li>the grouping variable to facet the charts by. If not supplied a non faceted plot is generated</li> </ul>
<code>facet_scales</code>	defaults to "free_y", but any of the usual ggplot2 facet values can be supplied e.g. "fixed" or "free_x"
<code>scale_type</code>	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
<code>datebreaks</code>	a character string specifying the breaks as text e.g "2 days" or "3 weeks". See ggplot2 <code>date_breaks</code> for further details
<code>title_text</code>	optional title for chart
<code>...</code>	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)
```

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cusum_single	<i>cusum_single</i>
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**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)
```

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cusum_single_df	<i>cusum_single_df</i>
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---

**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)
```

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cusum_single_median	<i>cusum_single_median</i>
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**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)
```

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`cusum_single_median_df`  
*cusum\_single\_median\_df*

---

**Description**

`cusum_single_median_df`

**Usage**

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

**Arguments**

<code>x</code>	a numeric vector from which to calculate the cumulative sum statistics
<code>target</code>	value to compare each element of <code>x</code> to. If not provided, the median value of <code>x</code> 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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