Package ‘runner’

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Description Fully supports rolling windows operations by controlling window length, window lag, time indexing. With runner one can apply any R function on rolling windows. Package eases work with equally and unequally spaced time series.
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fill_run  

Fill NA with previous non-NA element

Description

Fill NA with last non-NA element.

Usage

fill_run(x, run_for_first = FALSE, only_within = FALSE)

Arguments

x (vector, data.frame, matrix)  
Input in runner custom function f.

run_for_first If first elements are filled with NA, run_for_first = TRUE allows to fill all initial NA with nearest non-NA value. By default run_for_first = TRUE

only_within NA are replaced only if previous and next non-NA values are the same. By default only_within = TRUE

Value

vector - x containing all x elements with NA replaced with previous non-NA element.

Examples

fill_run(c(NA, NA, 1:10, NA, NA), run_for_first = TRUE)
fill_run(c(NA, NA, 1:10, NA, NA), run_for_first = TRUE)
fill_run(c(NA, NA, 1:10, NA, NA), run_for_first = FALSE)
fill_run(c(NA, NA, 1, 2, NA, NA, 2, 2, NA, NA, 1, NA, NA), run_for_first = TRUE, only_within = TRUE)
**k_by**

*Converts k and lag from time-unit-interval to int*

Description

Converts k and lag from time-unit-interval to int

Usage

`k_by(k, idx, param)`

Arguments

- **k**: object from runner
- **idx**: object from runner
- **param**: name of the parameter to be printed in error message

Examples

```r
k <- "1 month"
idx <- seq(as.POSIXct("2019-01-01 03:02:01"), as.POSIXct("2020-01-01 03:02:01"), by = "month")
k_difftime <- runner:::k_by(k, idx, param = "k")
idx - k_difftime
```

**lag_run**

*Lag dependent on variable*

Description

Vector of input lagged along integer vector

Usage

`lag_run(x, lag = 1L, idx = integer(0), nearest = FALSE)`

Arguments

- **x**: (vector, data.frame, matrix)
  Input in runner custom function `f`.
- **lag**: (integer vector or single value)
  Denoting window lag. If `lag` is a single value then window lag is constant for all elements, otherwise if `length(lag) == length(x)` different window size for each element. Negative value shifts window forward. One can also specify `lag` in the same way as by in `seq.POSIXt`. More in details.
length_run

idx (integer, Date, POSIXt)
Optional integer vector containing sorted (ascending) index of observation. By default idx is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then k and lag are depending on idx. Length of idx have to be equal of length x.

nearest logical single value. Applied when idx is used, then nearest = FALSE returns observation lagged exactly by the specified number of "periods". When nearest = TRUE function returns latest observation within lag window.

Examples

```r
lag_run(1:10, lag = 3)
lag_run(letters[1:10], lag = -2, idx = c(1, 1, 1, 2, 3, 4, 6, 7, 8, 10))
lag_run(letters[1:10], lag = 2, idx = c(1, 1, 1, 2, 3, 4, 6, 7, 8, 10), nearest = TRUE)
```

length_run

Length of running windows

Description

Number of elements in k-long window calculated on idx vector. If idx is an ‘as.integer(date)’ vector, then k=number of days in window - then the result is number of observations within k days window.

Usage

```r
length_run(k = integer(1), lag = integer(1), idx = integer(0))
```

Arguments

k (integer vector or single value)
Denoting size of the running window. If k is a single value then window size is constant for all elements, otherwise if length(k) == length(x) different window size for each element. One can also specify k in the same way as by in seq.POSIXt. More in details.

lag (integer vector or single value)
Denoting window lag. If lag is a single value then window lag is constant for all elements, otherwise if length(lag) == length(x) different window size for each element. Negative value shifts window forward. One can also specify lag in the same way as by in seq.POSIXt. More in details.

idx (integer, Date, POSIXt)
Optional integer vector containing sorted (ascending) index of observation. By default idx is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then k and lag are depending on idx. Length of idx have to be equal of length x.
max_run

Examples

length_run(k = 3, idx = c(1, 2, 2, 4, 5, 5, 5, 5, 5, 5))

max_run  Running maximum

Description

min_run calculates running max on given x numeric vector, specified k window size.

Usage

max_run(
  x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  na_rm = TRUE,
  na_pad = FALSE
)

Arguments

x (vector, data.frame, matrix)
  Input in runner custom function f.

k (integer vector or single value)
  Denoting size of the running window. If k is a single value then window size is constant for all elements, otherwise if length(k) == length(x) different window size for each element. One can also specify k in the same way as by in seq.POSIXt. More in details.

lag (integer vector or single value)
  Denoting window lag. If lag is a single value then window lag is constant for all elements, otherwise if length(lag) == length(x) different window size for each element. Negative value shifts window forward. One can also specify lag in the same way as by in seq.POSIXt. More in details.

idx (integer, Date, POSIXt)
  Optional integer vector containing sorted (ascending) index of observation. By default idx is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then k and lag are depending on idx. Length of idx have to be equal of length x.

at (integer, Date, POSIXt, character vector)
  Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at. Can be also POSIXt sequence increment seq.POSIXt. More in details.
mean_run

na_rm logical single value (default na_rm = TRUE) - if TRUE sum is calculating excluding NA.

na_pad (logical single value)
Whether incomplete window should return NA (if na_pad = TRUE) Incomplete window is when some parts of the window are out of range.

Value

max numeric vector of length equals length of x.

Examples

set.seed(11)
x1 <- sample( c(1,2,3), 15, replace=TRUE)
x2 <- sample( c(NA,1,2,3), 15, replace=TRUE)
k <- sample( 1:4, 15, replace=TRUE)
max_run(x1) # simple cumulative maximum
max_run(x2, na_rm = TRUE) # cumulative maximum with removing NA.
max_run(x2, na_rm = TRUE, k=4) # maximum in 4-element window
max_run(x2, na_rm = FALSE, k=k) # maximum in varying k window size

mean_run

Running mean

Description

Running mean in specified window of numeric vector.

Usage

mean_run(
    x,
    k = integer(0),
    lag = integer(1),
    idx = integer(0),
    at = integer(0),
    na_rm = TRUE,
    na_pad = FALSE
)

Arguments

x numeric vector which running function is calculated on
k (integer' vector or single value)
Denoting size of the running window. If k is a single value then window size is constant for all elements, otherwise if length(k) != length(x) different window size for each element.
`minmax_run` Running min/max

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>lag</code></td>
<td>(integer vector or single value) Denoting window lag. If <code>lag</code> is a single value then window lag is constant for all elements, otherwise if <code>length(lag) == length(x)</code> different window size for each element. Negative value shifts window forward.</td>
</tr>
<tr>
<td><code>idx</code></td>
<td>(integer, Date, POSIXt) Optional integer vector containing sorted (ascending) index of observation. By default <code>idx</code> is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then <code>k</code> and <code>lag</code> are depending on <code>idx</code>. Length of <code>idx</code> have to be equal of length <code>x</code>.</td>
</tr>
<tr>
<td><code>at</code></td>
<td>(integer, Date, POSIXt, character vector) Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at.</td>
</tr>
<tr>
<td><code>na_rm</code></td>
<td>logical single value (default <code>na_rm = TRUE</code>) - if <code>TRUE</code> sum is calculating excluding NA.</td>
</tr>
<tr>
<td><code>na_pad</code></td>
<td>(logical single value) Whether incomplete window should return NA (if <code>na_pad = TRUE</code>) Incomplete window is when some parts of the window are out of range.</td>
</tr>
</tbody>
</table>

Value

mean numeric vector of length equals length of `x`.

Examples

```r
set.seed(11)
x1 <- rnorm(15)
x2 <- sample(c(rep(NA,5), rnorm(15)), 15, replace = TRUE)
k <- sample(1:15, 15, replace = TRUE)
mean_run(x1)
mean_run(x2, na_rm = TRUE)
mean_run(x2, na_rm = FALSE)
mean_run(x2, na_rm = TRUE, k=4)
```

Description

`min_run` calculates running minimum-maximum on given `x` numeric vector, specified `k` window size.

Usage

```r
minmax_run(x, metric = "min", na_rm = TRUE)
```
**Arguments**

- **x** (vector, data.frame, matrix)
  Input in runner custom function f.

- **metric** character
  what to return, minimum or maximum

- **na_rm** logical single value (default na_rm = TRUE) - if TRUE sum is calculating excluding NA.

**Value**

list.

---

**min_run** *Running minimum*

**Description**

min_run calculates running min on given x numeric vector, specified k window size.

**Usage**

```r
min_run(
  x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  na_rm = TRUE,
  na_pad = FALSE
)
```

**Arguments**

- **x** (vector, data.frame, matrix)
  Input in runner custom function f.

- **k** (integer vector or single value)
  Denoting size of the running window. If k is a single value then window size is constant for all elements, otherwise if length(k) == length(x) different window size for each element. One can also specify k in the same way as by in seq.POSIXt. More in details.

- **lag** (integer vector or single value)
  Denoting window lag. If lag is a single value then window lag is constant for all elements, otherwise if length(lag) == length(x) different window size for each element. Negative value shifts window forward. One can also specify lag in the same way as by in seq.POSIXt. More in details.
idx (integer, Date, POSIXt)
Optional integer vector containing sorted (ascending) index of observation. By default idx is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then k and lag are depending on idx. Length of idx have to be equal of length x.

at (integer, Date, POSIXt, character vector)
Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at. Can be also POSIXt sequence increment seq.POSIXt. More in details.

na.rm logical single value (default na.rm = TRUE) - if TRUE sum is calculating excluding NA.

na_pad (logical single value)
Whether incomplete window should return NA (if na_pad = TRUE) Incomplete window is when some parts of the window are out of range.

Value
min numeric vector of length equals length of x.

Examples
set.seed(11)
x1 <- sample(c(1, 2, 3), 15, replace = TRUE)
x2 <- sample(c(NA, 1, 2, 3), 15, replace = TRUE)
k <- sample(1:4, 15, replace = TRUE)
min_run(x1)
min_run(x2, na.rm = TRUE)
min_run(x2, na.rm = TRUE, k = 4)
min_run(x2, na.rm = FALSE, k = k)

---

reformat_k

Formats time-unit-interval to valid for runner

Description
Formats time-unit-interval to valid for runner

Usage
reformat_k(k, only_positive = TRUE)

Arguments
k (k or lag) object from runner to be formatted
only_positive for k is TRUE, for lag is FALSE
Examples

```r
runner:::reformat_k("1 days")
runner:::reformat_k("day")
runner:::reformat_k("10 days")
runner:::reformat_k("-10 days", only_positive = FALSE)
runner:::reformat_k(c("-10 days", "2 months"), only_positive = FALSE)
```

Description

Applies custom function on running windows.

Usage

```r
runner(
  x,
  f = function(x) x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  na_pad = FALSE,
  type = "auto",
  ...
)
```

Arguments

- `x` (vector, data.frame, matrix)
  Input in runner custom function `f`.

- `f` (function)
  Applied on windows created from `x`. This function is meant to summarize windows and create single element for each window, but one can also specify function which return multiple elements (runner output will be a list). By default runner returns windows as is (`f = function(x)`).

- `k` (integer vector or single value)
  Denoting size of the running window. If `k` is a single value then window size is constant for all elements, otherwise if `length(k) == length(x)` different window size for each element. One can also specify `k` in the same way as by in `seq.POSIXt`. More in details.

- `lag` (integer vector or single value)
  Denoting window lag. If `lag` is a single value then window lag is constant for all elements, otherwise if `length(lag) == length(x)` different window size for each element. Negative value shifts window forward. One can also specify `lag` in the same way as by in `seq.POSIXt`. More in details.
idx (integer, Date, POSIXt)
Optional integer vector containing sorted (ascending) index of observation. By default idx is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then k and lag are depending on idx. Length of idx have to be equal of length x.

at (integer, Date, POSIXt, character vector)
Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at. Can be also POSIXt sequence increment seq.POSIXt. More in details.

na_pad (logical single value)
Whether incomplete window should return NA (if na_pad = TRUE) Incomplete window is when some parts of the window are out of range.

type (character single value)
output type ("auto","logical","numeric","integer","character"). runner by default guess type automatically. In case of failure of "auto" please specify desired type.

... (optional)
other arguments passed to the function f.

details
Function can apply any R function on running windows defined by x, k, lag, idx and at. Running window can be calculated on several ways:

- **Cumulative windows**
applied when user doesn’t specify k argument or specify k = length(x), this would mean that k is equal to number of available elements

- **Constant sliding windows**
applied when user specify k as constant value keeping idx and at unspecified. lag argument shifts windows left (lag > 0) or right (lag < 0).
• Windows depending on date
If one specifies \( \text{idx} \) this would mean that output windows size might change in size because of unequally spaced indexes. For example 5-period window is different than 5-element window, because 5-period window might contain any number of observation (7-day mean is not the same as 7-element mean).

• Window at specific indices
runner by default returns vector of the same size as \( x \) unless one specifies \( \text{at} \) argument. Each element of \( \text{at} \) is an index on which runner calculates function - which means that output of the runner is now of length equal to \( \text{at} \). Note that one can change index of \( x \) by specifying \( \text{idx} \).

Illustration below shows output of runner for \( \text{at} = c(18, 27, 45, 31) \) which gives windows in ranges enclosed in square brackets. Range for \( \text{at} = 27 \) is [22, 26] which is not available in current indices.

\( \text{at} \) can also be specified as interval of the output defined by \( \text{at} = "<\text{increment}>" \) which results in output on following indices seq.POSIXt(min(idx), max(idx), by = "<increment>"). Increment of sequence is the same as in seq.POSIXt function. It’s worth noting that increment interval can’t be more frequent than interval of \( \text{idx} \) - for Date the most frequent time-unit is a "day", for POSIXt a sec.

\( k \) and \( \text{lag} \) can also be specified as using time sequence increment. Available time units are "sec", "min", "hour", "day", "DSTday", "week", "month", "quarter" or "year". To increment by number of units one can also specify <number> <unit>s for example \( \text{lag} = "-2 \text{ days}" \), \( k = \)
"5 weeks".

Above is not enough since \( k \) and lag can be a vector which allows to stretch and lag/lead each window freely on in time (on indices).

**Value**

vector with aggregated values for each window. Length of output is the same as `length(x)` or `length(at)` if specified. Type of the output is taken from `type` argument.

**Examples**

```r
# runner returns windows as is by default
runner(1:10)

# mean on \( k = 3 \) elements windows
runner(1:10, f = mean, k = 3)

# mean on \( k = 3 \) elements windows with different specification
runner(1:10, k = 3, f = function(x) mean(x, na.rm = TRUE))

# concatenate two columns
runner(
  data.frame(
    a = letters[1:10],
    b = 1:10
  ),
  f = function(x) paste(paste0(x$a, x$b), collapse = "+"),
  type = "character"
)

# concatenate two columns with additional argument
runner(
  data.frame(
    a = letters[1:10],
    b = 1:10
  ),
  f = function(x, xxx) {
    paste(paste0(x$a, xxx, x$b), collapse = " + ")
  },
  xxx = "...",
  type = "character"
)

# number of unique values in each window (varying window size)
runner(letters[1:10],
  k = c(1, 2, 2, 4, 5, 5, 5, 5, 5, 5),
  f = function(x) length(unique(x)))

# concatenate only on selected windows index
runner(letters[1:10],
  f = function(x) paste(x, collapse = "-"),
)
at = c(1, 5, 8),
type = "character")

# 5 days mean
idx <- c(4, 6, 7, 13, 17, 18, 21, 27, 31, 37, 42, 44, 47, 48)
runner::runner(
  x = idx,
  k = "5 days",
  lag = 1,
  idx = Sys.Date() + idx,
  f = function(x) mean(x)
)

# 5 days mean at 4-indices
runner::runner(
  x = 1:15,
  k = 5,
  lag = 1,
  idx = idx,
  at = c(18, 27, 48, 31),
  f = mean
)

---

seq_by

Creates sequence for at as time-unit-interval

Description

Creates sequence for at as time-unit-interval

Usage

seq_by(at, idx)

Arguments

at object from runner
idx object from runner

---

streak_run

Running streak length

Description

Calculates running series of consecutive elements
streak_run

Usage

```r
streak_run(
  x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  na_rm = TRUE,
  na_pad = FALSE
)
```

Arguments

- **x**: any type vector which running function is calculated on
- **k**: (integer vector or single value)
  Denoting size of the running window. If `k` is a single value then window size is constant for all elements, otherwise if `length(k) == length(x)` different window size for each element. One can also specify `k` in the same way as by in `seq.POSIXt`. More in details.
- **lag**: (integer vector or single value)
  Denoting window lag. If `lag` is a single value then window lag is constant for all elements, otherwise if `length(lag) == length(x)` different window size for each element. Negative value shifts window forward. One can also specify `lag` in the same way as by in `seq.POSIXt`. More in details.
- **idx**: (integer, Date, POSIXt)
  Optional integer vector containing sorted (ascending) index of observation. By default `idx` is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then `k` and `lag` are depending on `idx`. Length of `idx` have to be equal of length `x`.
- **at**: (integer, Date, POSIXt, character vector)
  Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at. Can be also POSIXt sequence increment `seq.POSIXt`. More in details.
- **na_rm**: logical single value (default `na_rm = TRUE`) - if TRUE sum is calculating excluding NA.
- **na_pad**: (logical single value)
  Whether incomplete window should return NA (if `na_pad = TRUE`) Incomplete window is when some parts of the window are out of range.

Value

streak [numeric] vector of length equals length of `x` containing number of consecutive occurrences.

Examples

```r
set.seed(11)
x1 <- sample(c("a","b"), 15, replace = TRUE)
```
x2 <- sample(c(NA_character_, "a", "b"), 15, replace = TRUE)
k <- sample(1:4, 15, replace = TRUE)
streak_run(x1) # simple streak run
streak_run(x1, k = 2) # streak run within 2-element window
streak_run(x2, na_pad = TRUE, k = 3) # streak run within k=3 with padding NA
streak_run(x1, k = k) # streak run within varying window size specified by vector k

---

**sum_run**

**Running sum**

**Description**

Running sum in specified window of numeric vector.

**Usage**

```r
sum_run(
  x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  na_rm = TRUE,
  na_pad = FALSE
)
```

**Arguments**

- **x** numeric vector which running function is calculated on
- **k** (integer vector or single value)
  Denoting size of the running window. If k is a single value then window size is constant for all elements, otherwise if length(k) == length(x) different window size for each element.
- **lag** (integer vector or single value)
  Denoting window lag. If lag is a single value then window lag is constant for all elements, otherwise if length(lag) == length(x) different window size for each element. Negative value shifts window forward.
- **idx** (integer, Date, POSIXt)
  Optional integer vector containing sorted (ascending) index of observation. By default idx is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then k and lag are depending on idx. Length of idx have to be equal of length x.
- **at** (integer, Date, POSIXt, character vector)
  Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at.
**which_run**

`na_rm` logical single value (default `na_rm = TRUE`) - if `TRUE` sum is calculating excluding NA.

`na_pad` (logical single value)
Whether incomplete window should return NA (if `na_pad = TRUE`) Incomplete window is when some parts of the window are out of range.

**Value**

sum code vector of length equals length of `x`.

**Examples**

```r
set.seed(11)
x1 <- rnorm(15)
x2 <- sample(c(rep(NA, 5), rnorm(15)), 15, replace = TRUE)
k <- sample(1:15, 15, replace = TRUE)
sum_run(x1)
sum_run(x2, na_rm = TRUE)
sum_run(x2, na_rm = FALSE)
sum_run(x2, na_rm = TRUE, k = 4)
```

**which_run**

Running which

**Description**

`min_run` calculates running which - returns index of element where `x == TRUE`.

**Usage**

```r
which_run(
  x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  which = "last",
  na_rm = TRUE,
  na_pad = FALSE
)
```

**Arguments**

- `x` (vector, data.frame, matrix)
  Input in runner custom function `f`.  

which_run

\[ \text{k} \] (integer vector or single value)
Denoting size of the running window. If \( k \) is a single value then window size is constant for all elements, otherwise if \( \text{length}(k) = \text{length}(x) \) different window size for each element. One can also specify \( k \) in the same way as by in \text{seq.POSIXt}. More in details.

\[ \text{lag} \] (integer vector or single value)
Denoting window lag. If \( \text{lag} \) is a single value then window lag is constant for all elements, otherwise if \( \text{length}(\text{lag}) = \text{length}(x) \) different window size for each element. Negative value shifts window forward. One can also specify \( \text{lag} \) in the same way as by in \text{seq.POSIXt}. More in details.

\[ \text{idx} \] (integer, Date, POSIXt)
Optional integer vector containing sorted (ascending) index of observation. By default \( \text{idx} \) is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then \( k \) and \( \text{lag} \) are depending on \( \text{idx} \). Length of \( \text{idx} \) have to be equal of \text{length} \( x \).

\[ \text{at} \] (integer, Date, POSIXt, character vector)
Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at. Can be also \text{POSIXt} sequence increment \text{seq.POSIXt}. More in details.

\[ \text{which} \]
character value "first" or "last" denoting if the first or last \text{TRUE} index is returned from the window.

\[ \text{na.rm} \]
logical single value (default \( \text{na.rm} = \text{TRUE} \)) - if \text{TRUE} sum is calculating excluding NA.

\[ \text{na.pad} \]
(logical single value)
Whether incomplete window should return NA (if \( \text{na.pad} = \text{TRUE} \)) Incomplete window is when some parts of the window are out of range.

Value

integer vector of indexes of the same length as \( x \).

Examples

```r
set.seed(11)
x1 <- sample(c(1, 2, 3), 15, replace = TRUE)
x2 <- sample(c(NA, 1, 2, 3), 15, replace = TRUE)
k <- sample(1:4, 15, replace = TRUE)
which_run(x1)
which_run(x2, na_rm = TRUE)
which_run(x2, na_rm = TRUE, k = 4)
which_run(x2, na_rm = FALSE, k = k)
```
window_run

**List of running windows**

**Description**

Creates list of windows with given arguments settings. Length of output list is equal

**Usage**

```r
window_run(
  x,
  k = integer(0),
  lag = integer(1),
  idx = integer(0),
  at = integer(0),
  na_pad = FALSE
)
```

**Arguments**

- `x` (vector, data.frame, matrix)
  - Input in runner custom function `f`.
- `k` (integer vector or single value)
  - Denoting size of the running window. If `k` is a single value then window size is constant for all elements, otherwise if `length(k) == length(x)` different window size for each element. One can also specify `k` in the same way as by in `seq.POSIXt`. More in details.
- `lag` (integer vector or single value)
  - Denoting window lag. If `lag` is a single value then window lag is constant for all elements, otherwise if `length(lag) == length(x)` different window size for each element. Negative value shifts window forward. One can also specify `lag` in the same way as by in `seq.POSIXt`. More in details.
- `idx` (integer, Date, POSIXt)
  - Optional integer vector containing sorted (ascending) index of observation. By default `idx` is index incremented by one. User can provide index with varying increment and with duplicated values. If specified then `k` and `lag` are depending on `idx`. Length of `idx` have to be equal of length `x`.
- `at` (integer, Date, POSIXt, character vector)
  - Vector of any size and any value defining output data points. Values of the vector defines the indexes which data is computed at. Can be also POSIXt sequence increment `seq.POSIXt`. More in details.
- `na_pad` (logical single value)
  - Whether incomplete window should return NA (if `na_pad = TRUE`) Incomplete window is when some parts of the window are out of range.
window_run

Value
list of vectors (windows). Length of list is the same as length(x) or length(at) if specified, and length of each window is defined by k (unless window is out of range).

Examples

window_run(1:10, k = 3, lag = -1)
window_run(letters[1:10], k = c(1, 2, 2, 4, 5, 5, 5, 5, 5, 5))
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