Package ‘MatrixGenerics’

February 25, 2024

Title S4 Generic Summary Statistic Functions that Operate on Matrix-Like Objects

Description S4 generic functions modeled after the 'matrixStats' API for alternative matrix implementations. Packages with alternative matrix implementation can depend on this package and implement the generic functions that are defined here for a useful set of row and column summary statistics. Other package developers can import this package and handle a different matrix implementations without worrying about incompatibilities.

biocViews Infrastructure, Software

URL https://bioconductor.org/packages/MatrixGenerics

BugReports https://github.com/Bioconductor/MatrixGenerics/issues

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Imports methods

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'rowAnys.R' 'rowAvgsPerColSet.R' 'rowCollapse.R' 'rowCounts.R'
'rowCummaxs.R' 'rowCummins.R' 'rowCumprods.R' 'rowCumsums.R'
'rowDiffs.R' 'rowIQRDiffs.R' 'rowIQRs.R' 'rowLogSumExps.R'
'rowMadDiffs.R' 'rowMads.R' 'rowMaxs.R' 'rowMeans.R'
'rowMeans2.R' 'rowMedians.R' 'rowMins.R' 'rowOrderStats.R'
'rowProds.R' 'rowQuantiles.R' 'rowRanges.R' 'rowRanks.R'
'rowSdDiffs.R' 'rowSds.R' 'rowSums.R' 'rowSums2.R'
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The MatrixGenerics package defines S4 generic summary statistic functions that operate on matrix-like objects.

**rowAlls**

Check if all elements in a row (column) of a matrix-like object are equal to a value.

**Description**

Check if all elements in a row (column) of a matrix-like object are equal to a value.

**Usage**

```r
rowAlls(x, rows = NULL, cols = NULL, value = TRUE, na.rm = FALSE, ...,
useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
rowAlls(x, rows = NULL,
       cols = NULL, value = TRUE, na.rm = FALSE, dim. = dim(x), ...,
       useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
rowAlls(x, rows = NULL, cols = NULL, value = TRUE,
        na.rm = FALSE, ..., useNames = TRUE)
```

```r
colAlls(x, rows = NULL, cols = NULL, value = TRUE,
        na.rm = FALSE, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colAlls(x, rows = NULL,
```
### S4 method for signature 'ANY'

```r
colAlls(x, rows = NULL, cols = NULL, value = TRUE, na.rm = FALSE, ..., useNames = TRUE)
```

**Arguments**

- `x`: An NxK matrix-like object.
- `rows, cols`: A vector indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- `value`: The value to search for.
- `na.rm`: If `TRUE`, missing values (`NA` or `NaN`) are omitted from the calculations.
- `...`: Additional arguments passed to specific methods.
- `useNames`: If `TRUE` (default), names attributes of result are set. Else if `FALSE`, no naming support is done.
- `dim.`: An integer vector of length two specifying the dimension of `x`, essential when `x` is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

**Details**

The S4 methods for `x` of type `matrix`, `array`, `table`, or `numeric` call `matrixStats::rowAlls` / `matrixStats::colAlls`.

**Value**

Returns a logical vector of length N (K).

**See Also**

- `matrixStats::rowAlls()` and `matrixStats::colAlls()` which are used when the input is a matrix or numeric vector.
- For checks if any element is equal to a value, see `rowAnys()`.
- `base::all()`.

**Examples**

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
m[2, 1] <- NA
m[3, 3] <- Inf
m[4, 1] <- 0

print(mat)
rowAlls(mat)
colAlls(mat)
```
rowAnyNAs

Check if any elements in a row (column) of a matrix-like object is missing.

Description

Check if any elements in a row (column) of a matrix-like object is missing.

Usage

rowAnyNAs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowAnyNAs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowAnyNAs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

colAnyNAs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colAnyNAs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colAnyNAs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowAnyNAs / matrixStats::colAnyNAs.

Value

Returns a logical vector of length N (K).
See Also

- `matrixStats::rowAnyNAs()` and `matrixStats::colAnyNAs()` which are used when the input is a matrix or numeric vector.
- For checks if any element is equal to a value, see `rowAnys()`.
- `base::is.na()` and `base::any()`.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowAnyNAs(mat)
colAnyNAs(mat)
```

### Description

Check if any elements in a row (column) of a matrix-like object is equal to a value.

**Usage**

```r
data.rowAnys <- c(0, 1, 2, 3, 4)
data.colAnys <- c(0, 1, 2, 3, 4)

rowAnys <- function(x, rows = NULL, cols = NULL, value = TRUE, na.rm = FALSE, 
useNames = TRUE) {
  # S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
  rowAnys(x, rows = NULL, 
            cols = NULL, value = TRUE, na.rm = FALSE, dim. = dim(x), 
            useNames = TRUE)
}

colAnys <- function(x, rows = NULL, cols = NULL, value = TRUE, na.rm = FALSE, 
                    useNames = TRUE) {
  # S4 method for signature 'ANY'
  colAnys(x, rows = NULL, cols = NULL, value = TRUE, 
           na.rm = FALSE, ..., useNames = TRUE)
}
```

---

**rowAnys**

*Check if any elements in a row (column) of a matrix-like object is equal to a value*
## S4 method for signature 'ANY'

colAnys(x, rows = NULL, cols = NULL, value = TRUE,
    na.rm = FALSE, ..., useNames = TRUE)

### Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- **value**: The value to search for.
- **na.rm**: If `TRUE`, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If `TRUE` (default), names attributes of result are set. Else if `FALSE`, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

### Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowAnys / matrixStats::colAnys.

### Value

Returns a logical vector of length N (K).

### See Also

- matrixStats::rowAnys() and matrixStats::colAnys() which are used when the input is a matrix or numeric vector.
- For checks if all elements are equal to a value, see rowAlls().
- base::any().

### Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
m[2, 1] <- NA
m[3, 3] <- Inf
m[4, 1] <- 0

print(mat)
rowAnys(mat)
colAnys(mat)
```
Description

Calculates for each row (column) a summary statistic for equally sized subsets of columns (rows).

Usage

rowAvgsPerColSet(X, W = NULL, rows = NULL, S, FUN = rowMeans, ..., na.rm = NA, tFUN = FALSE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowAvgsPerColSet(X, W = NULL, 
  rows = NULL, S, FUN = rowMeans, ..., na.rm = NA, tFUN = FALSE)

## S4 method for signature 'ANY'
rowAvgsPerColSet(X, W = NULL, rows = NULL, S, 
  FUN = rowMeans, ..., na.rm = NA, tFUN = FALSE)

colAvgsPerRowSet(X, W = NULL, cols = NULL, S, FUN = colMeans, ..., na.rm = NA, tFUN = FALSE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colAvgsPerRowSet(X, W = NULL, 
  cols = NULL, S, FUN = colMeans, ..., na.rm = NA, tFUN = FALSE)

## S4 method for signature 'ANY'

colAvgsPerRowSet(X, W = NULL, cols = NULL, S, 
  FUN = colMeans, ..., na.rm = NA, tFUN = FALSE)

Arguments

X An NxM matrix-like object.
W An optional numeric NxM matrix of weights.
rows, cols A vector indicating the subset (and/or columns) to operate over. If NULL, no subsetting is done.
S An integer KxJ matrix that specifying the J subsets. Each column hold K column (row) indices for the corresponding subset. The range of values is [1, M] ([1,N]).
FUN A row-by-row (column-by-column) summary statistic function. It is applied to to each column (row) subset of X that is specified by S.
... Additional arguments passed to FUN.
na.rm (logical) Argument passed to FUN() as na.rm = na.rm. If NA (default), then na.rm = TRUE is used if X or S holds missing values, otherwise na.rm = FALSE.
tFUN If TRUE, X is transposed before it is passed to FUN.
Details

The S4 methods for x of type matrix.array.table, or numeric call matrixStats::rowAvgsPerColSet / matrixStats::colAvgsPerRowSet.

Value

Returns a numeric JxN (MxJ) matrix.

See Also

• matrixStats::rowAvgsPerColSet() and matrixStats::colAvgsPerRowSet() which are used when the input is a matrix or numeric vector.

Examples

mat <- matrix(rnorm(20), nrow = 5, ncol = 4)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
S <- matrix(1:ncol(mat), ncol = 2)
print(S)
rowAvgsPerColSet(mat, S = S, FUN = rowMeans)
rowAvgsPerColSet(mat, S = S, FUN = rowVars)

Description

Extract one cell from each row (column) of a matrix-like object.

Usage

rowCollapse(x, idxs, rows = NULL, ..., useNames = TRUE)

# S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowCollapse(x, idxs, rows = NULL, dim. = dim(x), ..., useNames = TRUE)

# S4 method for signature 'ANY'
rowCollapse(x, idxs, rows = NULL, ..., useNames = TRUE)

colCollapse(x, idxs, cols = NULL, ..., useNames = TRUE)
colCollapse(x, idxs, cols = NULL, dim. = dim(x), ..., useNames = TRUE)

Arguments

- **x**: An NxK matrix-like object.
- **idxs**: An index vector with the position to extract. It is recycled to match the number of rows (column)
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowCollapse / matrixStats::colCollapse.

Value

Returns a numeric vector of length N (K).

See Also

- matrixStats::rowCollapse() and matrixStats::colCollapse() which are used when the input is a matrix or numeric vector.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowCollapse(mat, idxs = 2)
rowCollapse(mat, idxs = c(1,1,2,3,2))

colCollapse(mat, idxs = 4)
```
rowCounts

Count how often an element in a row (column) of a matrix-like object is equal to a value

Description

Count how often an element in a row (column) of a matrix-like object is equal to a value.

Usage

rowCounts(x, rows = NULL, cols = NULL, value = TRUE, na.rm = FALSE, 
..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowCounts(x, rows = NULL, 
cols = NULL, value = TRUE, na.rm = FALSE, dim. = dim(x), ..., 
useNames = TRUE)

## S4 method for signature 'ANY'
rowCounts(x, rows = NULL, cols = NULL, value = TRUE, 
na.rm = FALSE, ..., useNames = TRUE)

colCounts(x, rows = NULL, cols = NULL, value = TRUE, 
na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colCounts(x, rows = NULL, 
cols = NULL, value = TRUE, na.rm = FALSE, dim. = dim(x), ..., 
useNames = TRUE)

## S4 method for signature 'ANY'
colCounts(x, rows = NULL, cols = NULL, value = TRUE, 
na.rm = FALSE, ..., useNames = TRUE)

Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **value**: The value to search for.
- **na.rm**: If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.
rowCummaxs

Details

The S4 methods for `x` of type `matrix, array, table, or numeric` call `matrixStats::rowCounts` / `matrixStats::colCounts`.

Value

Returns a integer vector of length N (K).

See Also

- `matrixStats::rowCounts()` and `matrixStats::colCounts()` which are used when the input is a matrix or numeric vector.
- For checks if any element is equal to a value, see `rowAnys()`. To check if all elements are equal, see `rowAlls()`.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowCounts(mat)
colCounts(mat)
rowCounts(mat, value = 0)
colCounts(mat, value = Inf, na.rm = TRUE)
```

---

rowCummaxs

Calculates the cumulative maxima for each row (column) of a matrix-like object

Description

Calculates the cumulative maxima for each row (column) of a matrix-like object.

Usage

```r
rowCummaxs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
```r
rowCummaxs(x, rows = NULL,
  cols = NULL, dim. = dim(x), ..., useNames = TRUE)
```

## S4 method for signature 'ANY'
```r
rowCummaxs(x, rows = NULL, cols = NULL, ...
  useNames = TRUE)
```
colCummaxs(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colCummaxs(x, rows = NULL,
            cols = NULL, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colCummaxs(x, rows = NULL, cols = NULL, ...,
            useNames = TRUE)

Arguments

x                    An N x K matrix-like object.
rows, cols            A vector indicating the subset of rows (and/or columns) to operate over. If
                       NULL, no subsetting is done.
...                   Additional arguments passed to specific methods.
useNames              If TRUE (default), names attributes of result are set. Else if FALSE, no naming
                       support is done.
dim.                  An integer vector of length two specifying the dimension of x, essential when
                       x is a numeric vector. Note, that this is not a generic argument and not all
                       methods need provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowCummaxs
/ matrixStats::colCummaxs.

Value

Returns a numeric matrix with the same dimensions as x.

See Also

• matrixStats::rowCummaxs() and matrixStats::colCummaxs() which are used when the
  input is a matrix or numeric vector.
• For single maximum estimates, see rowMaxs().
• base::cummax().

Examples

mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
\textbf{Description}

Calculates the cumulative minima for each row (column) of a matrix-like object.

\textbf{Usage}

\begin{verbatim}
rowCummins(x, rows = NULL, cols = NULL, ..., useNames = TRUE)
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowCummins(x, rows = NULL, cols = NULL, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowCummins(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

colCummins(x, rows = NULL, cols = NULL, ..., useNames = TRUE)
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colCummins(x, rows = NULL, cols = NULL, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colCummins(x, rows = NULL, cols = NULL, ..., useNames = TRUE)
\end{verbatim}

\textbf{Arguments}

\begin{itemize}
  \item \texttt{x} An NxK matrix-like object.
  \item \texttt{rows, cols} A \texttt{vector} indicating the subset of rows (and/or columns) to operate over. If \texttt{NULL}, no subsetting is done.
  \item \texttt{...} Additional arguments passed to specific methods.
  \item \texttt{useNames} If \texttt{TRUE} (default), names attributes of result are set. Else if \texttt{FALSE}, no naming support is done.
  \item \texttt{dim.} An \texttt{integer vector} of length two specifying the dimension of \texttt{x}, essential when \texttt{x} is a \texttt{numeric} vector. Note, that this is not a generic argument and not all methods need provide it.
\end{itemize}
Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowCummins / matrixStats::colCummins.

Value

Returns a numeric matrix with the same dimensions as x.

See Also

- matrixStats::rowCummins() and matrixStats::colCummins() which are used when the input is a matrix or numeric vector.
- For single minimum estimates, see rowMins().
- base::cummin().

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowCummins(mat)
colCummins(mat)
```

Description

Calculates the cumulative product for each row (column) of a matrix-like object.

Usage

```r
rowCumprods(x, rows = NULL, cols = NULL, ...,
            useNames = TRUE)
```
colCumprods(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colCumprods(x, rows = NULL,
        cols = NULL, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colCumprods(x, rows = NULL, cols = NULL, ...,
        useNames = TRUE)

Arguments

x            An NxK matrix-like object.
rows, cols    A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
...           Additional arguments passed to specific methods.
useNames      If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
dim.          An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowCumprods / matrixStats::colCumprods.

Value

Returns a numeric matrix with the same dimensions as x.

See Also

• matrixStats::rowCumprods() and matrixStats::colCumprods() which are used when the input is a matrix or numeric vector.
• base::cumprod().

Examples

mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowCumprods(mat)
colCumprods(mat)
Description

Calculates the cumulative sum for each row (column) of a matrix-like object.

Usage

rowCumsums(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowCumsums(x, rows = NULL, cols = NULL, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowCumsums(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

colCumsums(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colCumsums(x, rows = NULL, cols = NULL, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colCumsums(x, rows = NULL, cols = NULL, ..., useNames = TRUE)

Arguments

x An N×K matrix-like object.
rows, cols A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
... Additional arguments passed to specific methods.
useNames If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
dim. An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowCumsums / matrixStats::colCumsums.
rowDiffs

Value

Returns a numeric matrix with the same dimensions as x.

See Also

- matrixStats::rowCumsums() and matrixStats::colCumsums() which are used when the input is a matrix or numeric vector.
- base::cumsum().

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowCumsums(mat)
colCumsums(mat)
```

---

rowDiffs

Calculates the difference between each element of a row (column) of a matrix-like object

Description

Calculates the difference between each element of a row (column) of a matrix-like object.

Usage

```r
rowDiffs(x, rows = NULL, cols = NULL, lag = 1L, differences = 1L, ..., 
useNames = TRUE)
```

```r
# S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowDiffs(x, rows = NULL, 
cols = NULL, lag = 1L, differences = 1L, dim. = dim(x), ..., 
useNames = TRUE)
```

```r
# S4 method for signature 'ANY'
rowDiffs(x, rows = NULL, cols = NULL, lag = 1L, 
differences = 1L, ..., useNames = TRUE)
```

```r
colDiffs(x, rows = NULL, cols = NULL, lag = 1L, differences = 1L, ...,
useNames = TRUE)
```

```r
# S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
```
rowDiffs

```r
rowDiffs(x, rows = NULL,
         cols = NULL, lag = 1L, differences = 1L, dim. = dim(x), ...
         useNames = TRUE)
```

## S4 method for signature 'ANY'
```r
colDiffs(x, rows = NULL, cols = NULL, lag = 1L,
          differences = 1L, ..., useNames = TRUE)
```

### Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- **lag**: An integer specifying the lag.
- **differences**: An integer specifying the order of difference.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If `TRUE` (default), names attributes of result are set. Else if `FALSE`, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of `x`, essential when `x` is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

### Details

The S4 methods for `x` of type `matrix`, `array`, `table`, or numeric call `matrixStats::rowDiffs` / `matrixStats::colDiffs`.

### Value

Returns a numeric matrix with one column (row) less than `x`: \( N x (K - 1) \) or \( (N - 1)xK \).

### See Also

- `matrixStats::rowDiffs()` and `matrixStats::colDiffs()` which are used when the input is a matrix or numeric vector.
- `base::diff()`.

### Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowDiffs(mat)
colDiffs(mat)
```
rowIQRDiffs

Calculates the interquartile range of the difference between each element of a row (column) of a matrix-like object

**Description**

Calculates the interquartile range of the difference between each element of a row (column) of a matrix-like object.

**Usage**

```r
rowIQRDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, 
trim = 0, ..., useNames = TRUE)
```

### S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
rowIQRDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., 
useNames = TRUE)
```

### S4 method for signature 'ANY'

```r
rowIQRDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, 
trim = 0, ..., useNames = TRUE)
```

```r
colIQRDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, 
trim = 0, ..., useNames = TRUE)
```

### S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colIQRDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., 
useNames = TRUE)
```

### S4 method for signature 'ANY'

```r
colIQRDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, 
trim = 0, ..., useNames = TRUE)
```

**Arguments**

- `x`: An N×K matrix-like object.
- `rows, cols`: A vector indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- `na.rm`: If `TRUE`, missing values (`NA` or `NaN`) are omitted from the calculations.
- `diff`: An integer specifying the order of difference.
- `trim`: A double in [0,1/2] specifying the fraction of observations to be trimmed from each end of (sorted) `x` before estimation.
- `...`: Additional arguments passed to specific methods.
- `useNames`: If `TRUE` (default), names attributes of result are set. Else if `FALSE`, no naming support is done.
rowIQRs

Details
The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowIQRDiffs / matrixStats::colIQRDiffs.

Value
Returns a numeric vector of length N (K).

See Also
- matrixStats::rowIQRDiffs() and matrixStats::colIQRDiffs() which are used when the input is a matrix or numeric vector.
- For the direct interquartile range see also rowIQRs.

Examples
```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
rowIQRDiffs(mat)
colIQRDiffs(mat)
```

Description
Calculates the interquartile range for each row (column) of a matrix-like object.

Usage
```r
rowIQRs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowIQRs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

```r
## S4 method for signature 'ANY'
rowIQRs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```
colIQRs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colIQRs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colIQRs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

Arguments

x
An NxK matrix-like object.

rows, cols
A vector indicating the subset of rows (and/or columns) to operate over. If
NULL, no subsetting is done.

na.rm
If TRUE, missing values (NA or NaN) are omitted from the calculations.

...
Additional arguments passed to specific methods.

useNames
If TRUE (default), names attributes of result are set. Else if FALSE, no naming
support is done.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowIQRs /
matrixStats::colIQRs.

Value

Returns a numeric vector of length N (K).

See Also

- matrixStats::rowIQRs() and matrixStats::colIQRs() which are used when the input is
  a matrix or numeric vector.
- For a non-robust analog, see rowSds(). For a more robust version see rowMads()
- stats::IQR().

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowIQRs(mat)
colIQRs(mat)
```
rowLogSumExps

Accurately calculates the logarithm of the sum of exponentials for each row (column) of a matrix-like object.

Description

Accurately calculates the logarithm of the sum of exponentials for each row (column) of a matrix-like object.

Usage

rowLogSumExps(lx, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowLogSumExps(lx, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(lx), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowLogSumExps(lx, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

colLogSumExps(lx, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colLogSumExps(lx, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(lx), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colLogSumExps(lx, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

Arguments

1x An NxK matrix-like object. Typically $l_x$ are $\log(x)$ values.

rows, cols A vector indicating the subset (and/or columns) to operate over. If NULL, no subsetting is done.

na.rm If TRUE, missing values (NA or NaN) are omitted from the calculations.

... Additional arguments passed to specific methods.

useNames If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

dim. An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.
Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowLogSumExps / matrixStats::colLogSumExps.

Value

Returns a numeric vector of length N (K).

See Also

• matrixStats::rowLogSumExps() and matrixStats::colLogSumExps() which are used when the input is a matrix or numeric vector.
• rowSums2()

Examples

mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowLogSumExps(mat)
colLogSumExps(mat)

rowMadDiffs

Calculates the mean absolute deviation of the difference between each element of a row (column) of a matrix-like object

Description

Calculates the mean absolute deviation of the difference between each element of a row (column) of a matrix-like object.

Usage

rowMadDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., useNames = TRUE)

## S4 method for signature 'matrix OR array OR table OR numeric'
rowMadDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowMadDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE,
rowMadDiffs

\[
diff = 1L, \ trim = 0, \ldots, \ useNames = \text{TRUE})
\]

colMadDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, \ldots, useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colMadDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, \ldots, useNames = TRUE)

## S4 method for signature 'ANY'
colMadDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, \ldots, useNames = TRUE)

Arguments

- **x** An NxK matrix-like object.
- **rows, cols** A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **na.rm** If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **diff** An integer specifying the order of difference.
- **trim** A double in [0,1/2] specifying the fraction of observations to be trimmed from each end of (sorted) x before estimation.
- **...** Additional arguments passed to specific methods.
- **useNames** If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowMadDiffs / matrixStats::colMadDiffs.

Value

Returns a numeric vector of length N (K).

See Also

- matrixStats::rowMadDiffs() and matrixStats::colMadDiffs() which are used when the input is a matrix or numeric vector.

Examples

mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
rowMadDiffs(mat)
colMadDiffs(mat)

rowMads  Calculates the median absolute deviation for each row (column) of a
          matrix-like object

Description
Calculates the median absolute deviation for each row (column) of a matrix-like object.

Usage
rowMads(x, rows = NULL, cols = NULL, center = NULL, constant = 1.4826,
na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowMads(x, rows = NULL,
    cols = NULL, center = NULL, constant = 1.4826, na.rm = FALSE,
    dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowMads(x, rows = NULL, cols = NULL, center = NULL,
    constant = 1.4826, na.rm = FALSE, ..., useNames = TRUE)

colMads(x, rows = NULL, cols = NULL, center = NULL,
    constant = 1.4826, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colMads(x, rows = NULL,
    cols = NULL, center = NULL, constant = 1.4826, na.rm = FALSE,
    dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colMads(x, rows = NULL, cols = NULL, center = NULL,
    constant = 1.4826, na.rm = FALSE, ..., useNames = TRUE)

Arguments
x        An NxK matrix-like object.
rows, cols A vector indicating the subset of rows (and/or columns) to operate over. If
            NULL, no subsetting is done.
center  (optional) the center, defaults to the row means
constant A scale factor. See stats::mad() for details.
rowMaxs

na.rm
If TRUE, missing values (NA or NaN) are omitted from the calculations.

... Additional arguments passed to specific methods.

useNames
If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

dim. An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details
The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowMads / matrixStats::colMads.

Value
Returns a numeric vector of length N (K).

See Also
• matrixStats::rowMads() and matrixStats::colMads() which are used when the input is a matrix or numeric vector.
• For mean estimates, see rowMeans2() and rowMeans().
• For non-robust standard deviation estimates, see rowSds().

Examples
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowMads(mat)
colMads(mat)

Calculates the maximum for each row (column) of a matrix-like object

Description
Calculates the maximum for each row (column) of a matrix-like object.
Usage

rowMaxs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

### S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowMaxs(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

### S4 method for signature 'ANY'
rowMaxs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

colMaxs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

### S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colMaxs(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

### S4 method for signature 'ANY'
colMaxs(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

Arguments

x An NxK matrix-like object.

rows, cols A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.

na.rm If TRUE, missing values (NA or NaN) are omitted from the calculations.

... Additional arguments passed to specific methods.

useNames If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

dim. An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowMaxs / matrixStats::colMaxs.

Value

Returns a numeric vector of length N (K).
rowMeans

Calculates the mean for each row (column) of a matrix-like object

Description

Calculates the mean for each row (column) of a matrix-like object.

Usage

rowMeans(x, na.rm = FALSE, dims = 1, ...)

colMeans(x, na.rm = FALSE, dims = 1, ...)

Arguments

x An NxK matrix-like object, a numeric data frame, or an array-like object of two or more dimensions.

na.rm If TRUE, missing values (NA or NaN) are omitted from the calculations.

dims A single integer indicating which dimensions are regarded as rows or columns to mean over. For rowMeans, the mean is over dimensions dims+1, ...; for colMeans it is over dimensions 1:dims.

... Additional arguments passed to specific methods.

Details

This man page documents the rowMeans and colMeans S4 generic functions defined in the Matrix-Generics package. See ?base::colMeans for the default methods (defined in the base package).

Value

Returns a numeric vector of length N (K).
See Also

- base::colMeans for the default rowMeans and colMeans methods.
- Matrix::colMeans in the Matrix package for rowMeans and colMeans methods defined for CsparseMatrix derivatives (e.g. dgCMatrix objects).

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowMeans(mat)
colMeans(mat)
```

rowMeans2

Calculates the mean for each row (column) of a matrix-like object

Description

Calculates the mean for each row (column) of a matrix-like object.

Usage

```r
rowMeans2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowMeans2(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowMeans2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

colMeans2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colMeans2(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colMeans2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```
Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If **NULL**, no subsetting is done.
- **na.rm**: If **TRUE**, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If **TRUE** (default), names attributes of result are set. Else if **FALSE**, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowMeans2 / matrixStats::colMeans2.

Value

Returns a numeric vector of length N (K).

See Also

- matrixStats::rowMeans2() and matrixStats::colMeans2() which are used when the input is a matrix or numeric vector.
- See also **rowMeans()** for the corresponding function in base R.
- For variance estimates, see **rowVars()**.
- See also the base R version base::rowMeans().

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowMeans2(mat)
colMeans2(mat)
```
rowMedians  

*Calculates the median for each row (column) of a matrix-like object*

**Description**

Calculates the median for each row (column) of a matrix-like object.

**Usage**

```r
rowMedians(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
rowMedians(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
rowMedians(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

```r
colMedians(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colMedians(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
colMedians(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

**Arguments**

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- **na.rm**: If `TRUE`, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If `TRUE` (default), names attributes of result are set. Else if `FALSE`, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of `x`, essential when `x` is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.
The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowMedians / matrixStats::colMedians.

Returns a numeric vector of length N (K).

• matrixStats::rowMedians() and matrixStats::colMedians() which are used when the input is a matrix or numeric vector.

• For mean estimates, see rowMeans2() and rowMeans().

Examples

```r
c <- matrix(rnorm(15), nrow = 5, ncol = 3)
c[2, 1] <- NA
c[3, 3] <- Inf
c[4, 1] <- 0
c
rowMedians(c)
colMedians(c)
```

---

**rowMins**

*Calculates the minimum for each row (column) of a matrix-like object*

Calculates the minimum for each row (column) of a matrix-like object.

*Usage*

```r
rowMins(x, rows = NULL, cols = NULL, na.rm = FALSE, ...
useNames = TRUE)
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowMins(x, rows = NULL,
cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowMins(x, rows = NULL, cols = NULL, na.rm = FALSE, ...
useNames = TRUE)

colMins(x, rows = NULL, cols = NULL, na.rm = FALSE, ...,
```
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colMins(x, rows = NULL,
       cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
colMins(x, rows = NULL, cols = NULL, na.rm = FALSE, ...
         useNames = TRUE)
```

### Arguments

- **x**
  - An N\(\times\)K matrix-like object.
- **rows, cols**
  - A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **na.rm**
  - If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **...**
  - Additional arguments passed to specific methods.
- **useNames**
  - If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **dim.**
  - An integer vector of length two specifying the dimension of \(x\), essential when \(x\) is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

### Details

The S4 methods for \(x\) of type matrix, array, table, or numeric call `matrixStats::rowMins` / `matrixStats::colMins`.

### Value

Returns a numeric vector of length N (K).

### See Also

- `matrixStats::rowMins()` and `matrixStats::colMins()` which are used when the input is a matrix or numeric vector.
- For max estimates, see `rowMaxs()`.

### Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowMins(mat)
colMins(mat)
```
rowOrderStats

**Description**

Calculates an order statistic for each row (column) of a matrix-like object.

**Usage**

rowOrderStats(x, rows = NULL, cols = NULL, which, ..., useNames = TRUE)

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowOrderStats(x, rows = NULL, cols = NULL, which, ..., useNames = TRUE)
```

```r
## S4 method for signature 'ANY'
rowOrderStats(x, rows = NULL, cols = NULL, which, ..., useNames = TRUE)
```

colOrderStats(x, rows = NULL, cols = NULL, which, ..., useNames = TRUE)

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colOrderStats(x, rows = NULL, cols = NULL, which, ..., useNames = TRUE)
```

```r
## S4 method for signature 'ANY'
colOrderStats(x, rows = NULL, cols = NULL, which, ..., useNames = TRUE)
```

**Arguments**

- **x**: An NxF matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **which**: An integer index in [1.K] ([1.N]) indicating which order statistic to be returned
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

**Details**

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowOrderStats / matrixStats::colOrderStats.
Value

Returns a numeric vector of length N (K).

See Also

- `matrixStats::rowOrderStats()` and `matrixStats::colOrderStats()` which are used when the input is a matrix or numeric vector.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- 2
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowOrderStats(mat, which = 1)
colOrderStats(mat, which = 3)
```

---

rowProds

Calculates the product for each row (column) of a matrix-like object

Description

Calculates the product for each row (column) of a matrix-like object.

Usage

```r
rowProds(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowProds(x, rows = NULL, cols = NULL, na.rm = FALSE, method = c("direct", "expSumLog"), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowProds(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

colProds(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colProds(x, rows = NULL, cols = NULL, na.rm = FALSE, method = c("direct", "expSumLog"), ..., useNames = TRUE)
```

Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **na.rm**: If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **method**: A character vector of length one that specifies the how the product is calculated. Note, that this is not a generic argument and not all implementation have to provide it.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowProds / matrixStats::colProds.

Value

Returns a numeric vector of length N (K).

See Also

- matrixStats::rowProds() and matrixStats::colProds() which are used when the input is a matrix or numeric vector.
- For sums across rows (columns), see rowSums2() (colSums2())
- base::prod().

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)

rowProds(mat)
colProds(mat)
```
Description

Calculates quantiles for each row (column) of a matrix-like object.

Usage

```
rowQuantiles(x, rows = NULL, cols = NULL, probs = seq(from = 0, to = 1,
by = 0.25), na.rm = FALSE, type = 7L, ..., useNames = TRUE,
drop = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowQuantiles(x, rows = NULL,
cols = NULL, probs = seq(from = 0, to = 1, by = 0.25), na.rm = FALSE,
type = 7L, ..., useNames = TRUE, drop = TRUE)

## S4 method for signature 'ANY'
rowQuantiles(x, rows = NULL, cols = NULL,
probs = seq(from = 0, to = 1, by = 0.25), na.rm = FALSE, type = 7L,
..., useNames = TRUE, drop = TRUE)

colQuantiles(x, rows = NULL, cols = NULL, probs = seq(from = 0, to = 1,
by = 0.25), na.rm = FALSE, type = 7L, ..., useNames = TRUE,
drop = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colQuantiles(x, rows = NULL, cols = NULL,
probs = seq(from = 0, to = 1, by = 0.25), na.rm = FALSE, type = 7L,
..., useNames = TRUE, drop = TRUE)

## S4 method for signature 'ANY'
colQuantiles(x, rows = NULL, cols = NULL,
probs = seq(from = 0, to = 1, by = 0.25), na.rm = FALSE, type = 7L,
..., useNames = TRUE, drop = TRUE)

Arguments

- **x** An NxK matrix-like object.
- **rows, cols** A vector indicating the subset of rows (and/or columns) to operate over. If **NULL**, no subsetting is done.
- **probs** A numeric vector of J probabilities in \([0, 1]\).
- **na.rm** If **TRUE**, missing values (NA or NaN) are omitted from the calculations.
- **type** An integer specifying the type of estimator. See `stats::quantile()` for more details.
Additional arguments passed to specific methods.

useNames

If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

drop

If TRUE, a vector is returned if \( J = 1 \).

**Details**

The S4 methods for \( x \) of type `matrix`, `array`, `table`, or `numeric` call `matrixStats::rowQuantiles` / `matrixStats::colQuantiles`.

**Value**

A numeric \( N \times J \) (\( K \times J \)) matrix, where \( N \) (\( K \)) is the number of rows (columns) for which the \( J \) values are calculated.

**See Also**

- `matrixStats::rowQuantiles()` and `matrixStats::colQuantiles()` which are used when the input is a matrix or numeric vector.
- `stats::quantile`

**Examples**

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowQuantiles(mat)
colQuantiles(mat)
```

---

**rowRanges**

*Calculates the minimum and maximum for each row (column) of a matrix-like object*

**Description**

Calculates the minimum and maximum for each row (column) of a matrix-like object.
Usage

rowRanges(x, ...)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowRanges(x, rows = NULL,
        cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowRanges(x, ...)

colRanges(x, rows = NULL, cols = NULL, na.rm = FALSE, ...,
          useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colRanges(x, rows = NULL,
        cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
colRanges(x, rows = NULL, cols = NULL, na.rm = FALSE,
          ..., useNames = TRUE)

Arguments

x
  An NxK matrix-like object.

...  Additional arguments passed to specific methods.

rows, cols
  A vector indicating the subset of rows (and/or columns) to operate over. If
  NULL, no subsetting is done.

na.rm
  If TRUE, missing values (NA or NaN) are omitted from the calculations.

dim.
  An integer vector of length two specifying the dimension of x, essential when
  x is a numeric vector. Note, that this is not a generic argument and not all
  methods need provide it.

useNames
  If TRUE (default), names attributes of result are set. Else if FALSE, no naming
  support is done.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowRanges/
matrixStats::colRanges.

Value

a numeric Nx2 (Kx2) matrix, where N (K) is the number of rows (columns) for which the ranges
are calculated.

Note

Unfortunately for the argument list of the rowRanges() generic function we cannot follow the
scheme used for the other row/column matrix summarization generic functions. This is because
we need to be compatible with the historic rowRanges() getter for RangedSummarizedExperiment objects. See ?SummarizedExperiment::rowRanges.

See Also

- matrixStats::rowRanges() and matrixStats::colRanges() which are used when the input is a matrix or numeric vector.
- For max estimates, see rowMaxs().
- For min estimates, see rowMins().
- base::range().

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowRanges(mat)
colRanges(mat)
```

---

**rowRanks**

Calculates the rank of the elements for each row (column) of a matrix-like object.

### Description

Calculates the rank of the elements for each row (column) of a matrix-like object.

### Usage

```r
rowRanks(x, rows = NULL, cols = NULL, ties.method = c("max", "average"),
         ..., useNames = TRUE)
```

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowRanks(x, rows = NULL, cols = NULL, ties.method = c("max", "average", "first", "last", "random",
         "max", "min", "dense"), dim. = dim(x), ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowRanks(x, rows = NULL, cols = NULL, ties.method = c("max", "average"), ..., useNames = TRUE)
```

```r
colRanks(x, rows = NULL, cols = NULL, ties.method = c("max", "average"),
         ..., useNames = TRUE)
```
rowRanks

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colRanks(x, rows = NULL, 
    cols = NULL, ties.method = c("max", "average", "first", "last", "random", 
    "max", "min", "dense"), dim. = dim(x), preserveShape = FALSE, ...,
    useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
colRanks(x, rows = NULL, cols = NULL,
    ties.method = c("max", "average"), ..., useNames = TRUE)
```

### Arguments

- **x**: An N×K matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **ties.method**: A character string specifying how ties are treated. Note that the default specifies fewer options than the original matrixStats package.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.
- **preserveShape**: If TRUE the output matrix has the same shape as the input x. Note, that this is not a generic argument and not all implementation of this function have to provide it.

### Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowRanks / matrixStats::colRanks.

The matrixStats::rowRanks() function can handle a lot of different values for the ties.method argument. Users of the generic function should however only rely on max and average because the other ones are not guaranteed to be implemented:

- **max** for values with identical values the maximum rank is returned
- **average** for values with identical values the average of the ranks they cover is returned. Note, that in this case the return value is of type numeric.

### Value

A matrix of type integer is returned unless ties.method = "average". It has dimensions' N×J (K×J) matrix, where N (K) is the number of rows (columns) of the input x.
rowSdDiffs

See Also

- `matrixStats::rowRanks()` and `matrixStats::colRanks()` which are used when the input is a matrix or numeric vector.
- `base::rank`

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowRanks(mat)
colRanks(mat)
```

rowSdDiffs

Calculates the standard deviation of the difference between each element of a row (column) of a matrix-like object

Description

Calculates the standard deviation of the difference between each element of a row (column) of a matrix-like object.

Usage

```r
rowSdDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L,
          trim = 0, ..., useNames = TRUE)
```

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowSdDiffs(x, rows = NULL,
            cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, 
            useNames = TRUE)
```

```r
## S4 method for signature 'ANY'
rowSdDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE,
          diff = 1L, trim = 0, ..., useNames = TRUE)
```

```r
colSdDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L,
          trim = 0, ..., useNames = TRUE)
```

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colSdDiffs(x, rows = NULL,
            cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, 
            useNames = TRUE)
```
## S4 method for signature 'ANY'

```r
colSdDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, 
diff = 1L, trim = 0, ..., useNames = TRUE)
```

### Arguments

- **x**
  - An NxK matrix-like object.
- **rows, cols**
  - A `vector` indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- **na.rm**
  - If `TRUE`, missing values (NA or NaN) are omitted from the calculations.
- **diff**
  - An integer specifying the order of difference.
- **trim**
  - A double in [0,1/2] specifying the fraction of observations to be trimmed from each end of (sorted) x before estimation.
- **...**
  - Additional arguments passed to specific methods.
- **useNames**
  - If `TRUE` (default), names attributes of result are set. Else if `FALSE`, no naming support is done.

### Details

The S4 methods for `x` of type `matrix`, `array`, `table`, or `numeric` call `matrixStats::rowSdDiffs` / `matrixStats::colSdDiffs`.

### Value

Returns a `numeric vector` of length N (K).

### See Also

- `matrixStats::rowSdDiffs()` and `matrixStats::colSdDiffs()` which are used when the input is a matrix or numeric vector.
- For the direct standard deviation see `rowSds()`.

### Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowSdDiffs(mat)
colSdDiffs(mat)
```
rowSds

Calculates the standard deviation for each row (column) of a matrix-like object

Description

Calculates the standard deviation for each row (column) of a matrix-like object.

Usage

rowSds(x, rows = NULL, cols = NULL, na.rm = FALSE, center = NULL, ...,
       useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowSds(x, rows = NULL,
       cols = NULL, na.rm = FALSE, center = NULL, dim. = dim(x), ...,
       useNames = TRUE)

## S4 method for signature 'ANY'
rowSds(x, rows = NULL, cols = NULL, na.rm = FALSE,
       center = NULL, ..., useNames = TRUE)

colSds(x, rows = NULL, cols = NULL, na.rm = FALSE,
       center = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colSds(x, rows = NULL,
       cols = NULL, na.rm = FALSE, center = NULL, dim. = dim(x), ...,
       useNames = TRUE)

## S4 method for signature 'ANY'
colSds(x, rows = NULL, cols = NULL, na.rm = FALSE,
       center = NULL, ..., useNames = TRUE)

Arguments

x
  An NxK matrix-like object.
rows, cols
  A vector indicating the subset of rows (and/or columns) to operate over. If
  NULL, no subsetting is done.
na.rm
  If TRUE, missing values (NA or NaN) are omitted from the calculations.
center
  (optional) the center, defaults to the row means
...
  Additional arguments passed to specific methods.
useNames
  If TRUE (default), names attributes of result are set. Else if FALSE, no naming
  support is done.
dim.
  An integer vector of length two specifying the dimension of x, essential when
  x is a numeric vector. Note, that this is not a generic argument and not all
  methods need provide it.
Details

The S4 methods for \( x \) of type \texttt{matrix}, \texttt{array}, \texttt{table}, or \texttt{numeric} call \texttt{rowSds} / \texttt{colSds}.

Value

Returns a \texttt{numeric} \texttt{vector} of length \( N(K) \).

See Also

- \texttt{rowSds()} and \texttt{colSds()} which are used when the input is a matrix or numeric vector.
- For mean estimates, see \texttt{rowMeans2()} and \texttt{rowMeans()}.
- For variance estimates, see \texttt{rowVars()}.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
m[2, 1] <- NA
m[3, 3] <- Inf
m[4, 1] <- 0

print(mat)
rowSds(m)
colSds(m)
```

Description

Calculates the sum for each row (column) of a matrix-like object.

Usage

```r
rowSums(x, na.rm = FALSE, dims = 1, ...)
colSums(x, na.rm = FALSE, dims = 1, ...)
```

Arguments

- \( x \): An \( N \times K \) matrix-like object, a numeric data frame, or an array-like object of two or more dimensions.
- \( na.rm \): If \texttt{TRUE}, missing values (\texttt{NA} or \texttt{NaN}) are omitted from the calculations.
- \( dims \): A single integer indicating which dimensions are regarded as rows or columns to sum over. For \texttt{rowSums}, the sum is over dimensions \( \text{dims+1}, \ldots \); for \texttt{colSums} it is over dimensions \( 1:\text{dims} \).
- \( ... \): Additional arguments passed to specific methods.
Details

This man page documents the `rowSums` and `colSums` S4 generic functions defined in the `MatrixGenerics` package. See `?base::colSums` for the default methods (defined in the `base` package).

Value

Returns a numeric vector of length N (K).

See Also

- `base::colSums` for the default `rowSums` and `colSums` methods.
- `Matrix::colSums` in the `Matrix` package for `rowSums` and `colSums` methods defined for CsparseMatrix derivatives (e.g. dgCMatrix objects).

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
rowSums(mat)
colSums(mat)
```

```
rowSums2
Calculates the sum for each row (column) of a matrix-like object
```

Description

Calculates the sum for each row (column) of a matrix-like object.

Usage

```r
rowSums2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

```r
## S4 method for signature 'matrix OR array OR table OR numeric'
rowSums2(x, rows = NULL, cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)
```

```r
## S4 method for signature 'ANY'
rowSums2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)
```

```r
colSums2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., 
```

### S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colSums2(x, rows = NULL, 
cols = NULL, na.rm = FALSE, dim. = dim(x), ..., useNames = TRUE)
```

### S4 method for signature 'ANY'

```r
colSums2(x, rows = NULL, cols = NULL, na.rm = FALSE, ..., 
useNames = TRUE)
```

## Arguments

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **na.rm**: If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
- **dim.**: An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

## Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowSums2 / matrixStats::colSums2.

## Value

Returns a numeric vector of length N (K).

## See Also

- matrixStats::rowSums2() and matrixStats::colSums2() which are used when the input is a matrix or numeric vector.
- For mean estimates, see rowMeans2() and rowMeans().
- base::sum().

## Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
```
rowTabulates

Tabulates the values in a matrix-like object by row (column).

**Description**
Tabulates the values in a matrix-like object by row (column).

**Usage**

```r
rowTabulates(x, rows = NULL, cols = NULL, values = NULL, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
rowTabulates(x, rows = NULL, cols = NULL, values = NULL, ..., useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
rowTabulates(x, rows = NULL, cols = NULL, values = NULL, ..., useNames = TRUE)
```

```r
colTabulates(x, rows = NULL, cols = NULL, values = NULL, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colTabulates(x, rows = NULL, cols = NULL, values = NULL, ..., useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
colTabulates(x, rows = NULL, cols = NULL, values = NULL, ..., useNames = TRUE)
```

**Arguments**

- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **values**: The values to search for.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

**Details**
The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowTabulates / matrixStats::colTabulates.
Value

A numeric N x J (K x J) matrix, where N (K) is the number of rows (columns) for which the J values are calculated.

See Also

- matrixStats::rowTabulates() and matrixStats::colTabulates() which are used when the input is a matrix or numeric vector.
- base::table()

Examples

```r
mat <- matrix(rpois(15, lambda = 3), nrow = 5, ncol = 3)
mat[2, 1] <- NA_integer_
mat[3, 3] <- 0L
mat[4, 1] <- 0L

print(mat)
rowTabulates(mat)
colTabulates(mat)

rowTabulates(mat, values = 0)
colTabulates(mat, values = 0)
```

---

**rowVarDiffs**

Calculates the variance of the difference between each element of a row (column) of a matrix-like object

Description

Calculates the variance of the difference between each element of a row (column) of a matrix-like object.

Usage

```r
rowVarDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L,
trim = 0, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
rowVarDiffs(x, rows = NULL,
cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ...
useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
rowVarDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE,
diff = 1L, trim = 0, ..., useNames = TRUE)
```
colVarDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colVarDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colVarDiffs(x, rows = NULL, cols = NULL, na.rm = FALSE, diff = 1L, trim = 0, ..., useNames = TRUE)

Arguments
- **x**: An NxK matrix-like object.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **na.rm**: If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **diff**: An integer specifying the order of difference.
- **trim**: A double in [0,1/2] specifying the fraction of observations to be trimmed from each end of (sorted) x before estimation.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

Details
The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowVarDiffs / matrixStats::colVarDiffs.

Value
Returns a numeric vector of length N (K).

See Also
- matrixStats::rowVarDiffs() and matrixStats::colVarDiffs() which are used when the input is a matrix or numeric vector.
- for the direct variance see rowVars().

Examples
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
rowVarDiffs(mat)
colVarDiffs(mat)

---

**rowVars**

**Calculates the variance for each row (column) of a matrix-like object**

**Description**

Calculates the variance for each row (column) of a matrix-like object.

**Usage**

```r
rowVars(x, rows = NULL, cols = NULL, na.rm = FALSE, center = NULL, 
        ...,
        useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
rowVars(x, rows = NULL, cols = NULL, na.rm = FALSE, center = NULL, dim. = dim(x), 
        ...,
        useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
rowVars(x, rows = NULL, cols = NULL, na.rm = FALSE, 
        center = NULL, ..., useNames = TRUE)
```

```r
colVars(x, rows = NULL, cols = NULL, na.rm = FALSE, 
        center = NULL, ..., useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'

```r
colVars(x, rows = NULL, cols = NULL, na.rm = FALSE, 
        center = NULL, dim. = dim(x), ..., useNames = TRUE)
```

## S4 method for signature 'ANY'

```r
colVars(x, rows = NULL, cols = NULL, na.rm = FALSE, 
        center = NULL, ..., useNames = TRUE)
```

**Arguments**

- **x**
  - An N×K matrix-like object.
- **rows, cols**
  - A vector indicating the subset of rows (and/or columns) to operate over. If `NULL`, no subsetting is done.
- **na.rm**
  - If `TRUE`, missing values (NA or NaN) are omitted from the calculations.
- **center**
  - (optional) the center, defaults to the row means.
- **...**
  - Additional arguments passed to specific methods.
rowWeightedMads

useNames
If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

dim.
An integer vector of length two specifying the dimension of x, essential when x is a numeric vector. Note, that this is not a generic argument and not all methods need provide it.

Details
The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowVars / matrixStats::colVars.

Value
Returns a numeric vector of length N (K).

See Also
- matrixStats::rowVars() and matrixStats::colVars() which are used when the input is a matrix or numeric vector.
- For mean estimates, see rowMeans2() and rowMeans().
- For standard deviation estimates, see rowSds().
- stats::var().

Examples
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
rowVars(mat)
colVars(mat)

rowWeightedMads
Calculates the weighted median absolute deviation for each row (column) of a matrix-like object

Description
Calculates the weighted median absolute deviation for each row (column) of a matrix-like object.
rowWeightedMads

Usage

rowWeightedMads(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE,
constant = 1.4826, center = NULL, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowWeightedMads(x, w = NULL,
rows = NULL, cols = NULL, na.rm = FALSE, constant = 1.4826,
center = NULL, ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowWeightedMads(x, w = NULL, rows = NULL, cols = NULL,
na.rm = FALSE, constant = 1.4826, center = NULL, ...,
useNames = TRUE)

colWeightedMads(x, w = NULL, rows = NULL, cols = NULL,
na.rm = FALSE, constant = 1.4826, center = NULL, ...,
useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colWeightedMads(x, w = NULL,
rows = NULL, cols = NULL, na.rm = FALSE, constant = 1.4826,
center = NULL, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colWeightedMads(x, w = NULL, rows = NULL, cols = NULL,
a.rm = FALSE, constant = 1.4826, center = NULL, ...,
useNames = TRUE)

Arguments

x An NxK matrix-like object.
w A numeric vector of length K (N) that specifies by how much each element is weighted.
rows, cols A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
na.rm If TRUE, missing values (NA or NaN) are omitted from the calculations.
constant A scale factor. See stats::mad() for details.
center (optional) the center, defaults to the row means
... Additional arguments passed to specific methods.
useNames If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowWeightedMads
/matrixStats::colWeightedMads.
**Value**

Returns a numeric vector of length N (K).

**See Also**

- `matrixStats::rowWeightedMads()` and `matrixStats::colWeightedMads()` which are used when the input is a matrix or numeric vector.
- See also `rowMads` for the corresponding unweighted function.

**Examples**

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
w <- rnorm(n = 5, mean = 3)
rowWeightedMads(mat, w = w[1:3])
colWeightedMads(mat, w = w)
```

---

**rowWeightedMeans**

Calculates the weighted mean for each row (column) of a matrix-like object

**Description**

Calculates the weighted mean for each row (column) of a matrix-like object.

**Usage**

```r
rowWeightedMeans(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ...,
useNames = TRUE)
```

```r
rowWeightedMeans(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ...,
useNames = TRUE)
```

```r
colWeightedMeans(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ...
useNames = TRUE)
```

```r
colWeightedMeans(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ...
useNames = TRUE)
```

```r
## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowWeightedMeans(x, w = NULL,
    rows = NULL, cols = NULL, na.rm = FALSE, ...,
    useNames = TRUE)
```

```r
## S4 method for signature 'ANY'
rowWeightedMeans(x, w = NULL, rows = NULL, cols = NULL,
    na.rm = FALSE, ...,
    useNames = TRUE)
```

```r
colWeightedMeans(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE,
    ...,
    useNames = TRUE)
```

```r
colWeightedMeans(x, w = NULL,
```

```r
```
rowWeightedMeans

rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colWeightedMeans(x, w = NULL, rows = NULL, cols = NULL,
na.rm = FALSE, ..., useNames = TRUE)

Arguments

x  
An N x K matrix-like object.

w  
A numeric vector of length K (N) that specifies by how much each element is
weighted.

rows, cols  
A vector indicating the subset of rows (and/or columns) to operate over. If
NULL, no subsetting is done.

na.rm  
If TRUE, missing values (NA or NaN) are omitted from the calculations.

...  
Additional arguments passed to specific methods.

useNames  
If TRUE (default), names attributes of result are set. Else if FALSE, no naming
support is done.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowWeightedMeans
/matrixStats::colWeightedMeans.

Value

Returns a numeric vector of length N (K).

See Also

• matrixStats::rowWeightedMeans() and matrixStats::colWeightedMeans() which are
used when the input is a matrix or numeric vector.

• See also rowMeans2 for the corresponding unweighted function.

Examples

mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
w <- rnorm(n = 5, mean = 3)
rowWeightedMeans(mat, w = w[1:3])
colWeightedMeans(mat, w = w)
rowWeightedMedians

Calculates the weighted median for each row (column) of a matrix-like object.

Description

Calculates the weighted median for each row (column) of a matrix-like object.

Usage

rowWeightedMedians(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowWeightedMedians(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowWeightedMedians(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

colWeightedMedians(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colWeightedMedians(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colWeightedMedians(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

Arguments

x An NxK matrix-like object.

w A numeric vector of length K (N) that specifies by how much each element is weighted.

rows, cols A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.

na.rm If TRUE, missing values (NA or NaN) are omitted from the calculations.

... Additional arguments passed to specific methods.

useNames If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.
Details

The S4 methods for \(x\) of type matrix, array, table, or numeric call `matrixStats::rowWeightedMedians` / `matrixStats::colWeightedMedians`.

Value

Returns a numeric vector of length \(N (K)\).

See Also

- `matrixStats::rowWeightedMedians()` and `matrixStats::colWeightedMedians()` which are used when the input is a matrix or numeric vector.
- See also `rowMedians` for the corresponding unweighted function.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
w <- rnorm(n = 5, mean = 3)
rowWeightedMedians(mat, w = w[1:3])
colWeightedMedians(mat, w = w)
```

rowWeightedSds

Calculates the weighted standard deviation for each row (column) of a matrix-like object.

Description

Calculates the weighted standard deviation for each row (column) of a matrix-like object.

Usage

```r
rowWeightedSds(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, 
... useNames = TRUE)
```

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
```
rowWeightedSds(x, w = NULL, 
rows = NULL, cols = NULL, na.rm = FALSE, ... useNames = TRUE)
```

## S4 method for signature 'ANY'
```
rowWeightedSds(x, w = NULL, rows = NULL, cols = NULL, 
na.rm = FALSE, ... useNames = TRUE)
```
Arguments

- **x**: An NxK matrix-like object.
- **w**: A numeric vector of length K (N) that specifies by how much each element is weighted.
- **rows, cols**: A vector indicating the subset of rows (and/or columns) to operate over. If NULL, no subsetting is done.
- **na.rm**: If TRUE, missing values (NA or NaN) are omitted from the calculations.
- **...**: Additional arguments passed to specific methods.
- **useNames**: If TRUE (default), names attributes of result are set. Else if FALSE, no naming support is done.

Details

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowWeightedSds / matrixStats::colWeightedSds.

Value

Returns a numeric vector of length N (K).

See Also

- matrixStats::rowWeightedSds() and matrixStats::colWeightedSds() which are used when the input is a matrix or numeric vector.
- See also rowSds for the corresponding unweighted function.

Examples

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0
print(mat)
w <- rnorm(n = 5, mean = 3)
rowWeightedSds(mat, w = w[1:3])
colWeightedSds(mat, w = w)
```
Calculates the weighted variance for each row (column) of a matrix-like object.

Usage

rowWeightedVars(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ...,
    useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
rowWeightedVars(x, w = NULL,
    rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'ANY'
rowWeightedVars(x, w = NULL, rows = NULL, cols = NULL,
    na.rm = FALSE, ..., useNames = TRUE)

colWeightedVars(x, w = NULL, rows = NULL, cols = NULL, na.rm = FALSE, ...
    , useNames = TRUE)

## S4 method for signature 'matrix_OR_array_OR_table_OR_numeric'
colWeightedVars(x, w = NULL,
    rows = NULL, cols = NULL, na.rm = FALSE, ..., useNames = TRUE)

## S4 method for signature 'ANY'
colWeightedVars(x, w = NULL, rows = NULL, cols = NULL,
    na.rm = FALSE, ..., useNames = TRUE)

Arguments

x
An NxK matrix-like object.

w
A numeric vector of length K (N) that specifies by how much each element is
weighted.

rows, cols
A vector indicating the subset of rows (and/or columns) to operate over. If
NULL, no subsetting is done.

na.rm
If TRUE, missing values (NA or NaN) are omitted from the calculations.

...
Additional arguments passed to specific methods.

useNames
If TRUE (default), names attributes of result are set. Else if FALSE, no naming
support is done.
**Details**

The S4 methods for x of type matrix, array, table, or numeric call matrixStats::rowWeightedVars / matrixStats::colWeightedVars.

**Value**

Returns a numeric vector of length N (K).

**See Also**

- matrixStats::rowWeightedVars() and matrixStats::colWeightedVars() which are used when the input is a matrix or numeric vector.
- See also rowVars for the corresponding unweighted function.

**Examples**

```r
mat <- matrix(rnorm(15), nrow = 5, ncol = 3)
mat[2, 1] <- NA
mat[3, 3] <- Inf
mat[4, 1] <- 0

print(mat)
w <- rnorm(n = 5, mean = 3)
rowWeightedVars(mat, w = w[1:3])
colWeightedVars(mat, w = w)
```
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