

**minmax()** — Minimums and maximums

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## Syntax

*real colvector*    `rowmin(real matrix X)`

*real rowvector*    `colmin(real matrix X)`

*real scalar*        `min(real matrix X)`

*real colvector*    `rowmax(real matrix X)`

*real rowvector*    `colmax(real matrix X)`

*real scalar*        `max(real matrix X)`

*real matrix*        `rowminmax(real matrix X)`

*real matrix*        `colminmax(real matrix X)`

*real rowvector*    `minmax(real matrix X)`

*real matrix*        `rowminmax(real matrix X, real scalar usemiss)`

*real matrix*        `colminmax(real matrix X, real scalar usemiss)`

*real rowvector*    `minmax(real matrix X, real scalar usemiss)`

*real colvector*    `rowmaxabs(numeric matrix A)`

*real rowvector*    `colmaxabs(numeric matrix A)`

## Description

These functions return the indicated minimums and maximums of  $X$ .

`rowmin( $X$ )` returns the minimum of each row of  $X$ , `colmin( $X$ )` returns the minimum of each column, and `min( $X$ )` returns the overall minimum. Elements of  $X$  that contain missing are ignored.

`rowmax( $X$ )` returns the maximum of each row of  $X$ , `colmax( $X$ )` returns the maximum of each column, and `max( $X$ )` returns the overall maximum. Elements of  $X$  that contain missing are ignored.

`rowminmax( $X$ )` returns the minimum and maximum of each row of  $X$  in an  $r \times 2$  matrix; `colminmax( $X$ )` returns the minimum and maximum of each column in a  $2 \times c$  matrix; and `minmax( $X$ )` returns the overall minimum and maximum. Elements of  $X$  that contain missing are ignored.

The two-argument versions of `rowminmax()`, `colminmax()`, and `minmax()` allow you to specify how missing values are to be treated. Specifying a second argument with value 0 is the same as using the single-argument versions of the functions. In the two-argument versions, if the second argument is not zero, missing values are treated like all other values in determining the minimums and maximums: *nonmissing* < . < .a < .b < ... < .z.

`rowmaxabs(A)` and `colmaxabs(A)` return the same result as `rowmax(abs(A))` and `colmax(abs(A))`. The advantage is that matrix `abs(A)` is never formed or stored, and so these functions use less memory.

## Conformability

`rowmin(X)`, `rowmax(X)`:

*X*:  $r \times c$   
*result*:  $r \times 1$

`colmin(X)`, `colmax(X)`:

*X*:  $r \times c$   
*result*:  $1 \times c$

`min(X)`, `max(X)`:

*X*:  $r \times c$   
*result*:  $1 \times 1$

`rowminmax(X, usemiss)`:

*X*:  $r \times c$   
*usemiss*:  $1 \times 1$   
*result*:  $r \times 2$

`colminmax(X, usemiss)`

*X*:  $r \times c$   
*usemiss*:  $1 \times 1$   
*result*:  $2 \times c$

`minmax(X, usemiss)`

*X*:  $r \times c$   
*usemiss*:  $1 \times 1$   
*result*:  $1 \times 2$

`rowmaxabs(A)`:

*A*:  $r \times c$   
*result*:  $r \times 1$

`colmaxabs(A)`:

*A*:  $r \times c$   
*result*:  $1 \times c$

## Diagnostics

`row*()` functions return missing value for the corresponding minimum or maximum when the entire row contains missing.

`col*()` functions return missing value for the corresponding minimum or maximum when the entire column contains missing.

`min()` and `max()` return missing value when the entire matrix contains missing.

## Also see

[M-5] **minindex()** — Indices of minimums and maximums

[M-4] **mathematical** — Important mathematical functions

[M-4] **utility** — Matrix utility functions