minmax( ) — Minimums and maximums

Syntax

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 × 2 matrix; colminmax(X) returns the minimum and maximum of each column in a 2 × 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:

\[
\text{nonmissing < . < .a < .b < \cdots < .z.}
\]

`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