**minmax() — Minimums and maximums**

**Description**

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

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

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

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

The two-argument versions of $\text{rowminmax}()$, $\text{colminmax}()$, and $\text{minmax}()$ 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: $\text{nonmissing} < . < .a < .b < \cdots < .z$.

$\text{rowmaxabs}(A)$ and $\text{colmaxabs}(A)$ return the same result as $\text{rowmax}(|A|)$ and $\text{colmax}(|A|)$. The advantage is that matrix $|A|$ is never formed or stored, and so these functions use less memory.
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)
Conformability

\[ \text{rowmin}(X), \text{rowmax}(X): \]
\[ X: \quad r \times c \]
\[ \text{result: } \quad r \times 1 \]

\[ \text{colmin}(X), \text{colmax}(X): \]
\[ X: \quad r \times c \]
\[ \text{result: } \quad 1 \times c \]

\[ \min(X), \max(X): \]
\[ X: \quad r \times c \]
\[ \text{result: } \quad 1 \times c \]

\[ \text{rowminmax}(X, \text{usemiss}): \]
\[ X: \quad r \times c \]
\[ \text{usemiss: } \quad 1 \times 1 \]
\[ \text{result: } \quad r \times 2 \]

\[ \text{colminmax}(X, \text{usemiss}): \]
\[ X: \quad r \times c \]
\[ \text{usemiss: } \quad 1 \times 1 \]
\[ \text{result: } \quad 2 \times c \]

\[ \minmax(X, \text{usemiss}): \]
\[ X: \quad r \times c \]
\[ \text{usemiss: } \quad 1 \times 1 \]
\[ \text{result: } \quad 1 \times 2 \]

\[ \text{rowmaxabs}(A): \]
\[ A: \quad r \times c \]
\[ \text{result: } \quad r \times 1 \]

\[ \text{colmaxabs}(A): \]
\[ A: \quad r \times c \]
\[ \text{result: } \quad 1 \times c \]

Diagnostics

\[ \text{row}^*(\cdot) \] functions return missing value for the corresponding minimum or maximum when the entire row contains missing.

\[ \text{col}^*(\cdot) \] functions return missing value for the corresponding minimum or maximum when the entire column contains missing.

\[ \min(\cdot) \] and \[ \max(\cdot) \] return missing value when the entire matrix contains missing.

Also see

[M-5] \textbf{minindex()} — Indices of minimums and maximums

[M-4] \textbf{mathematical} — Important mathematical functions

[M-4] \textbf{utility} — Matrix utility functions