**sum() — Sums**

### Description

rowsum(Z) and rowsum(Z, missing) return a column vector containing the sum over the rows of Z.

colsum(Z) and colsum(Z, missing) return a row vector containing the sum over the columns of Z.

sum(Z) and sum(Z, missing) return a scalar containing the sum over the rows and columns of Z.

quadrowsum(), quadcolsum(), and quadsum() are quad-precision variants of the above functions. The sum is accumulated in quad precision and then rounded to double precision and returned.

Argument `missing` determines how missing values are treated. If `missing` is not specified, results are the same as if `missing = 0` were specified: missing values are treated as zero. If `missing = 1` is specified, missing values are treated as missing values.

These functions may be used with real or complex matrix Z.

### Syntax

- `numeric colvector    rowsum(numeric matrix Z [, missing])`
- `numeric rowvector    colsum(numeric matrix Z [, missing])`
- `numeric scalar       sum(numeric matrix Z [, missing])`
- `numeric colvector    quadrowsum(numeric matrix Z [, missing])`
- `numeric rowvector    quadcolsum(numeric matrix Z [, missing])`
- `numeric scalar       quadsum(numeric matrix Z [, missing])`

where optional argument `missing` is a real scalar that determines how missing values in Z are treated:

1. Specifying `missing` as 0 is equivalent to not specifying the argument; missing values in Z are treated as contributing 0 to the sum.
2. Specifying `missing` as 1 (or nonzero) specifies that missing values in Z are to be treated as missing values and to turn the sum to missing.
Remarks and examples

All functions return the same type as the argument, real if argument is real, complex if complex.

Conformability

\[
\begin{align*}
\text{rowsum}(Z, \text{missing}), \quad \text{quadrowsum}(Z, \text{missing}) : \\
&Z: \quad r \times c \\
&\text{missing}: \quad 1 \times 1 \quad \text{(optional)} \\
&\text{result}: \quad r \times 1 \\
\text{colsum}(Z, \text{missing}), \quad \text{quadcolsum}(Z, \text{missing}) : \\
&Z: \quad r \times c \\
&\text{missing}: \quad 1 \times 1 \quad \text{(optional)} \\
&\text{result}: \quad 1 \times c \\
\text{sum}(Z, \text{missing}), \quad \text{quadsum}(Z, \text{missing}) : \\
&Z: \quad r \times c \\
&\text{missing}: \quad 1 \times 1 \quad \text{(optional)} \\
&\text{result}: \quad 1 \times 1
\end{align*}
\]

Diagnostics

If \( \text{missing} = 0 \), missing values are treated as contributing zero to the sum; they do not turn the sum to missing. Otherwise, missing values turn the sum to missing.

Also see

[M-5] \texttt{mean( )} — Means, variances, and correlations

[M-5] \texttt{runningsum( )} — Running sum of vector

[M-5] \texttt{cross( )} — Cross products

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

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