

## sum() — Sums

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## 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

`rowsum(Z, missing)`, `quadrowsum(Z, missing)`:

*Z*:  $r \times c$   
*missing*:  $1 \times 1$  (optional)  
*result*:  $r \times 1$

`colsum(Z, missing)`, `quadcolsum(Z, missing)`:

*Z*:  $r \times c$   
*missing*:  $1 \times 1$  (optional)  
*result*:  $1 \times c$

`sum(Z, missing)`, `quadsum(Z, missing)`:

*Z*:  $r \times c$   
*missing*:  $1 \times 1$  (optional)  
*result*:  $1 \times 1$

## Diagnostics

If `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] [mean\(\)](#) — Means, variances, and correlations

[M-5] [runningsum\(\)](#) — Running sum of vector

[M-5] [cross\(\)](#) — Cross products

[M-4] [mathematical](#) — Important mathematical functions

[M-4] [utility](#) — Matrix utility functions