

Description

`quadcross()` makes calculations of the form

$$X'X$$

$$X'Z$$

$$X'\text{diag}(w)X$$

$$X'\text{diag}(w)Z$$

This function mirrors `cross()` (see [M-5] [cross\(\)](#)), the difference being that sums are formed in quad precision rather than in double precision, so `quadcross()` is more accurate.

`quadcrossdev()` makes calculations of the form

$$(X: -x)'(X: -x)$$

$$(X: -x)'(Z: -z)$$

$$(X: -x)'\text{diag}(w)(X: -x)$$

$$(X: -x)'\text{diag}(w)(Z: -z)$$

This function mirrors `crossdev()` (see [M-5] [crossdev\(\)](#)), the difference being that sums are formed in quad precision rather than in double precision, so `quadcrossdev()` is more accurate.

Syntax

real matrix `quadcross(X, Z)`

real matrix `quadcross(X, w, Z)`

real matrix `quadcross(X, xc, Z, zc)`

real matrix `quadcross(X, xc, w, Z, zc)`

real matrix `quadcrossdev(X, x, Z, z)`

real matrix `quadcrossdev(X, x, w, Z, z)`

real matrix `quadcrossdev(X, xc, x, Z, zc, z)`

real matrix `quadcrossdev(X, xc, x, w, Z, zc, z)`

where

X : *real matrix X*
 xc : *real scalar xc*
 x : *real rowvector x*
 w : *real vector w*
 Z : *real matrix Z*
 zc : *real scalar zc*
 z : *real rowvector z*

Remarks and examples

The returned result is double precision, but the sum calculations made in creating that double-precision result were made in quad precision.

Conformability

`quadcross()` has the same conformability requirements as `cross()`; see [M-5] [cross\(\)](#).

`quadcrossdev()` has the same conformability requirements as `crossdev()`; see [M-5] [crossdev\(\)](#).

Diagnostics

See *Diagnostics* in [M-5] [cross\(\)](#) and *Diagnostics* in [M-5] [crossdev\(\)](#).

Also see

[M-5] [cross\(\)](#) — Cross products

[M-5] [crossdev\(\)](#) — Deviation cross products

[M-4] [Statistical](#) — Statistical functions

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

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