

Mathematical — Important mathematical functions

[Contents](#)
 [Description](#)
 [Remarks and examples](#)
 [Also see](#)

Contents

[M-5]

| Manual entry | Function | Purpose |
|--------------|----------|---------|
|--------------|----------|---------|

 Basics (also see [\[M-4\] Scalar](#))

| | | |
|---------------------|--|---|
| sum() | rowsum() colsum() sum() quadrowsum() quadcolsum() quadsum() | sum of each row sum of each column overall sum quad-precision sum of each row quad-precision sum of each column quad-precision overall sum |
| runningsum() | runningsum() quadruningsum() | running sum of vector quad-precision runningsum() |
| minmax() | rowmin() colmin() min() rowmax() colmax() max() rowminmax() colminmax() minmax() rowmaxabs() colmaxabs() | minimum, by row minimum, by column minimum, overall maximum, by row maximum, by column maximum, overall minimum and maximum, by row minimum and maximum, by column minimum and maximum, overall rowmax(abs()) colmax(abs()) |
| deriv() | deriv() deriv_init() deriv_init_*(*) deriv() deriv_result_*(*) deriv_query() | numerical derivatives begin derivatives set details compute derivatives access results report settings |
| optimize() | optimize() optimize_init() optimize_init_*(*) optimize() optimize_result_*(*) optimize_query() | function maximization and minimization begin optimization set details perform optimization access results report settings |

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| Basics, <i>continued</i> |
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|------------------------|---|--|
| moptimize() | <code>moptimize()</code> <code>moptimize_ado_cleanup()</code> <code>moptimize_evaluate()</code> <code>moptimize_init()</code> <code>moptimize_init_*</code> <code>moptimize_result_*</code> <code>moptimize_query()</code> <code>moptimize_util_*</code> | function optimization perform cleanup after ado evaluate function at initial values begin setup of optimization problem set details access <code>moptimize()</code> results report settings utility functions for writing evaluators and processing results |
| solvenl() | <code>solvenl_init()</code> <code>solvenl_init_*</code> <code>solvenl_solve()</code> <code>solvenl_result_*</code> <code>solvenl_dump()</code> | begin solver set details solve equations access results report detailed settings |
| LinearProgram() | <code>LinearProgram()</code> | linear programming |
| Quadrature() | <code>Quadrature()</code> <code>QuadratureVec()</code> | numerical integration vector of numerical integration |

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|-------------------|
| Fourier transform |
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| | | |
|--------------|---|---|
| fft() | <code>fft()</code> <code>invfft()</code> <code>convolve()</code> <code>deconvolve()</code> <code>Corr()</code> <code>ftperiodogram()</code> <code>ftpad()</code> <code>ftwrap()</code> <code>ftunwrap()</code> <code>ftretime()</code> <code>ftfreqs()</code> | fast Fourier transform inverse fast Fourier transform convolution inverse of <code>convolve()</code> correlation power spectrum pad to power-of-2 length convert to frequency-wraparound order convert from frequency-wraparound order change time scale of signal frequencies of transform |
|--------------|---|---|

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|---------------|
| Cubic splines |
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| spline3() | <code>spline3()</code> <code>spline3eval()</code> | fit cubic spline evaluate cubic spline |
|------------------|--|---|

Polynomials

| | | |
|-------------------|--|---|
| polyeval() | polyeval() polysolve() polytrim() polyderiv() polyinteg() polyadd() polymult() polydiv() polyroots() | evaluate polynomial solve for polynomial trim polynomial derivative of polynomial integral of polynomial add polynomials multiply polynomials divide polynomials find roots of polynomial |
|-------------------|--|---|

Number-theoretic point sets

| | | |
|-----------------|-----------------------|---|
| halton() | halton() ghalton() | generate a Halton or Hammersley set generate a generalized Halton sequence |
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Base conversion

| | | |
|-----------------|------------------------|--|
| inbase() | inbase() frombase() | convert to specified base convert from specified base |
|-----------------|------------------------|--|

Description

The above functions are important mathematical functions that most people would not call either matrix functions or scalar functions, but that use matrices and scalars.

Remarks and examples

[stata.com](https://www.stata.com)

For other mathematical functions, see

| | |
|--------------------------|-------------------------------|
| [M-4] Matrix | Matrix mathematical functions |
| [M-4] Scalar | Scalar mathematical functions |
| [M-4] Statistical | Statistical functions |

Also see

[M-4] **Intro** — Categorical guide to Mata functions

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