

**Mathematical** — Important mathematical functions

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Manual entry	Function	Purpose
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 Basics (also see [\[M-4\] Scalar](#))

<b>sum()</b>	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
<b>runningsum()</b>	runningsum() quadruningsum()	running sum of vector quad-precision runningsum()
<b>minmax()</b>	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())
<b>deriv()</b>	deriv() deriv_init() deriv_init_*(*) deriv() deriv_result_*(*) deriv_query()	numerical derivatives begin derivatives set details compute derivatives access results report settings
<b>optimize()</b>	optimize() optimize_init() optimize_init_*(*) optimize() optimize_result_*(*) optimize_query()	function maximization and minimization begin optimization set details perform optimization access results report settings

### Basics, *continued*

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<b>moptimize()</b>	<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
<b>solvenl()</b>	<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
<b>LinearProgram()</b>	<code>LinearProgram()</code>	linear programming
<b>Quadrature()</b>	<code>Quadrature()</code>	numerical integration

### Fourier transform

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<b>fft()</b>	<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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<b>spline3()</b>	<code>spline3()</code> <code>spline3eval()</code>	fit cubic spline evaluate cubic spline
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Polynomials
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<b>polyeval()</b>	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
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Number-theoretic point sets
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<b>halton()</b>	halton() ghalton()	generate a Halton or Hammersley set generate a generalized Halton sequence
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Base conversion
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<b>inbase()</b>	inbase() frombase()	convert to specified base convert from specified base
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## 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](http://stata.com)

For other mathematical functions, see

[M-4] <b>Matrix</b>	Matrix mathematical functions
[M-4] <b>Scalar</b>	Scalar mathematical functions
[M-4] <b>Statistical</b>	Statistical functions

## Also see

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