

**mathematical** — Important mathematical functions

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## Contents

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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() quadrunningsum()	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>	function optimization
	<code>moptimize_ado_cleanup()</code>	perform cleanup after ado
	<code>moptimize_evaluate()</code>	evaluate function at initial values
	<code>moptimize_init()</code>	begin setup of optimization problem
	<code>moptimize_init_*</code>	set details
	<code>moptimize_result_*</code>	access <code>moptimize()</code> results
	<code>moptimize_query()</code>	report settings
	<code>moptimize_util_*</code>	utility functions for writing evaluators and processing results
<b>solvenl()</b>	<code>solvenl_init()</code>	begin solver
	<code>solvenl_init_*</code>	set details
	<code>solvenl_solve()</code>	solve equations
	<code>solvenl_result_*</code>	access results
	<code>solvenl_dump()</code>	report detailed settings

### Fourier transform

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

### Cubic splines

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<b>spline3()</b>	<code>spline3()</code>	fit cubic spline
	<code>spline3eval()</code>	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](https://www.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