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Introduction to MATLAB for Math Modeling

MATLAB® provides many functions for implementing and analyzing mathematical models. The reference table below highlights a few core functions suitable for math modeling.

Quick Reference

Function	Example usage	Description	Doc
`:`	`years = 5:10`	Create a linearly spaced row vector: `years = [5,6,7,8,9,10]`	≫

`for`	`for year = 5:10`
	`  % body code`
	`end`
		Executes "`% body code`" six times with `year = 5` in the first execution	≫

`( )`	`years(3)`	Extract the third element in `years`: 7	≫
`zeros`	`pop = zeros(1,6)`	Create an array of 0's with 6 columns: `pop = [0,0,0,0,0,0]`	≫
`plot`	`plot(years,pop,'o')`	Plot `pop` against `years` with circles	≫
`.*`	`years.*pop`	Elementwise multiplication	≫
`readtable`	`data = readtable('catPop.xlsx')`	Load data from Excel file `'catPop.xlsx'` into a table	≫
`log`	`rc = log(1+rd)`	Compute the natural log of `1+rd`	≫
`fit`	`popFit = fit(years,pop,'exp1')`	Fit an exponential curve	≫
`linspace`	`t = linspace(0,7,100);`	Create an evenly spaced vector starting at 0 and ending at 7 with 100 elements	≫
`@( )`	`dgdt = @(t,g) g*cos(t)`	Create an anonymous function	≫
	`dgdt(pi,3)`	Evaluate an anonymous function. Here: `dgdt(pi,3) = -3`	
`ode45`	`[t,g] = ode45(dgdt, [0,10], -1)`	Numerically solve `dg/dt = g*cos(t)` on the interval `[0,10]` with `g(0) = -1`	≫

There's a lot more MATLAB out there to discover. Interested in learning more?

- MATLAB Onramp – a free online training
- Getting Started with MATLAB – a 10-minute introductory video
- Teaching Science with MATLAB – Resources for educators teaching with MATLAB