ME2 Computing Data Sheet

The table below lists every function that can possibly be asked for this year.

Function	Description	Syntax
****	matrix left divide command to solve a set of linear equations by Gaussian Elimination	x = A\b
abs	returns the absolute value of each element in X	Y = abs(X)
acos	inverse cosine; result in radians	y = acos(x)
atan	calculates the arctan of a number. Valid for domain [-pi/2,pi/2]	Y = atan(X)
atan2	four-quadrant inverse tangent. Valid for domain [-pi,pi].	P = atan2(Y,X)
axis	sets axis limits and aspect ratios. Specify the limits as a vector of four, six or eight elements	axis(limits)
cd	changes the current working directory displays the current folder	cd(newFolder) cd
ceil	rounds each element of X to the nearest integer greater or equal to that element	Y = ceil(X)

clear	clears the workspace of all variables	clear
colorbar	shows a color map for surface plots	colorbar colorbar(placement) colorbar(Name,Value) colorbar(placement,Name,Value)
copyfile	copies files	copyfile('source','destination')
csvwrite	writes matrix M into filename as comma-separated variables writes matrix M into filename starting at the specified row and column offset. Zero based.	csvwrite(filename,M) csvwrite(filename,M,row,col)
delete	deletes files and graphics objects only (to delete folders, use rmdir)	delete('filename1','filename2',…) delete filename delete(h)
det	returns the determinant of square matrix A	d = det(A)
diff	calculates the difference between adjacent elements of X along the first array dimension whose size does not equal 1 calculates the n^{th} difference calculated along the dimension specified by dim	Y = diff(X) Y = diff(X,n,dim)
dir	lists files and folders in the current folder lists files and folders that match name	dir dir name
disp	displays a string in the Matlab command window	disp(X)

dlmwrite	writes vectors or matrices of number to a file	dlmwrite(filename,M) dlmwrite(filename,M,delimiter) dlmwrite(filename,M,delimiter,row,col)
dlmread	read ASCII-delimited file of numeric data into a matrix	M = dlmread(filename) M = dlmread(filename,delimiter) M = dlmread(filename,delimiter,R1,C1) M = dlmread(filename,delimiter,[R1 C1 R2 C2])
end	Terminate a block of code	end
floor	round toward negative infinity	Y = floor(X)
fminsearch	find the local minimum in a function	x = fminsearch(fun,x0)
for…end	loop that repeats the statements within the described block for a predefined number of times	for index = values statements end
fplot	plots the curve defined by the function y = f(x) over the specified interval	fplot(f, [xmin , xmax])
function	defines a self-contained function	function [y1 , … , yN] = myfun(x1 , … , xN)
fzero	finds the roots of a function	x = fzero(fun,x0)
ginput	enables you to identify n points from the current axes and returns their x- and y-coordinates in the x and y column vectors	[x,y] = ginput(n)

grid	displays gridlines on the plot	grid on grid off grid grid minor
hold	retain current plot when adding new plots	hold on hold off hold all hold

if…else…end	executes a block after testing a logial statement	if expression
		  statements
		else
		  statements
		end

image	displays an image	image(C)
imread	reads in data from image files	A = imread(filename)
imwrite	writes image data to a file	imwrite(A,filename)
inline	defines a function without the need to create an m-file	inline('expr')
legend	displays a legend in a graph sets the legend labels	legend('show') legend(label1, … , labelN)
length	returns the length of the largest array dimension in X	L = length(X)
linspace	returns a row vector of 100 evenly spaced points between x1 and x2 generates n points. The spacing between the points is (x2-x1)/(n-1)	y = linspace(x1,x2) y = linspace(x1,x2,n)

ls	lists files and directories in a predefined path	ls
mean	returns the mean of the elements of A along the first array dimension whose size does not equal 1 returns the mean along dimension dim	M = mean(A) M = mean(A,dim)
mkdir	creates the folder folderName creates the folder folderName in parentFolder	mkdir('folderName') mkdir('parentFolder','folderName')
num2str	converts a numeric array into a character array that represents the numbers	s = num2str(A)
ones	creates a m by n matrix of ones	ones(m,n)
plot	plots two vectors	plot(X,Y) plot(X,Y,LineSpec) plot(X1,Y1,Linespec1, … ,Xn,Yn,LineSpecn)
polar **ezpolar**	creates a polar coordinate plot of the angle theta vs the radius rho plots the curve rho = fun(theta)	polar(theta,rho) ezpolar(fun)
polyfit	returns the coefficients of a polynomial p(x) of degree n that is a best fit for the data in y. The coefficients in p are in descending powers, and the length of p is n+1	p = polyfit(x,y,n)
polyval	returns the value of a polynomial of degree n evaluated at x. Input argument p is a vector of length n+1 whose elements are the coefficients in descending powers of the polynomial	y = polyval(p,x)
quad	numerically integrates a function across a and b uses an absolute error tolerance tol instead of the default which is 1.0e-6	q = quad(fun,a,b) q = quad(fun,a,b,tol)

rand	creates a random number between 0 to 1 creates a m-by-n matrix of random numbers	X = rand X = rand(m,n)
rmdir	removes the folder folderName from the current folder if folderName is empty removes the folder folderName and all subfolders and files	rmdir(folderName) rmdir(folderName,'s')
roots	returns the roots of the polynomial represented by p as a column vector. Input p is a vector containing n+1 polynomial coefficients, starting with the coefficient x^n	r = roots(p)
save	saves data to a file	save(filename)
sqrt	calculates the square root of a number	B = sqrt(X)
strcat	concatenates (merges) two strings	s = strcat(s1, … ,sN)
subplot	divides the figure into an m-by-n grid and creates an axes for a subplot in the position specified by p	subplot(m,n,p)
surf	function to plot a surface	surf(Z)
sum	returns the sum of the elements of A along the first array whose size does not equal 1 returns the sum along dimension dim	S = sum(A) S = sum(A,dim)
text	adds a text description to one or more data points in the current axes. To add text to one point, specify x and y as scalars in data units	text(x,y,txt)

title	adds the specified title at the top and in the centre of the current axes adds a title to the object specified by obj	title(txt) title(obj,__)
trapz	returns the approximate integral of Y via the trapezoidal method with unit spacing integrates Y with spacing increment X	Q = trapz(Y) Q = trapz(X,Y)
uigetdir	opens a browser to locate a directory	folder_name = uigetdir
uigetfile	opens the dialogue box to select a file	filename = uigetfile [FileName,PathName,FilterIndex] = uigetfile
unwrap	corrects the radian phase angles in a vector P by adding multiples of 2π when absolute jumps between consecutive elements of P are greater or equal to the default jump tolerance of π	Q = uwrap(P)
waitbar	displays a waitbar of fractional length x. The argument x must be between 0 and 1	h = waitbar(x,'message')
while…end	executes statements in a block until a certain condition is fulfilled	while expression statements end
xlabel	label the x axis of a plot	xlabel(txt)
ylabel	label the y axis of a plot	ylabel(txt)
zeros	crates a m by n matrix of zeros	zeros(m,n)