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# Matlab operations and functions

## Arithmetic operations

+	addition
-	subtraction
*	multiplication (scalar and matrix)
/	division (right)
\	left division (for matrices)
^	exponentiation
.*	element-wise multiplication
./	element-wise division
.^	element-wise exponentiation

## Predefined variables

pi	$\pi$ (3.14159 ...)
e	exp(1) ... Euler's number e (2.7183 ...)
i, j	imaginary unit of a complex number
eps	floating-point relative accuracy
inf	infinity
NaN	not a number

## Relational and logical operators

==	equal to
~=	not equal to
>	greater than
>=	greater than or equal to
<	less than
<=	less than or equal to
~	logical NOT
&	logical AND (element-wise)
	logical OR (element-wise)
&&	logical AND (short-circuit)
	logical OR (short-circuit)

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## Elementary functions

sin(x)	$\sin x$
cos(x)	$\cos x$
tan(x)	$\operatorname{tg} x$
asin(x)	$\arcsin x$
acos(x)	$\arccos x$
atan(x)	$\operatorname{arctg} x$
log(x)	$\ln x$
exp(x)	$e^x$
sqrt(x)	$\sqrt{x}$
power(a,x)	$a^x$
mod(x,y)	remainder after $x$ divided by $y$
abs(x)	$ x $ (modulus)
sign(x)	signum function
round(x)	round
ceil(x)	round up
floor(x)	round down

## Useful vector and matrix functions

size(v)	number of rows and columns
length(v)	length of a vector
end	last index
max(v)	maximum
min(v)	minimum
sum(v)	sum
find(v)	finds indices of nonzero elements
sort(v)	sorting elements

## Elementary matrix generators

eye(m,n)	m-by-n matrix with 1 on the main diagonal
zeros(m,n)	m-by-n matrix of zeros
ones(m,n)	m-by-n matrix of ones
rand(m,n)	m-by-n matrix of random numbers

Note: if  $m=n$ , functions above can have just 1 argument, as  $\operatorname{eye}(n)$

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## Attributes for plot (triplets)

symbol	color	symbol	line style	symbol	marker
r	red	-	solid (default)	*	asterisk
g	green	--	dashed	o	circle
b	blue (default)	:	dotted	x	cross
k	black	-.	dash-dot	s	square
m	magenta			d	diamond
c	cyan			+	crosshair
y	yellow			h	hexagram
				.	dot

## Useful commands

↑	recalls a previously typed command at the prompt
clear	removes all variables from Workspace
clear x	removes variable x from Workspace
who, whos	displays variables in the current scope
format	number formatting
clc	clears Command window
help	displays help for functions and commands
lookfor	looks up specified word (e.g. lookfor time)
diary (filename)	saves a complete MATLAB session (until <i>diary off</i> )
ctrl-c	stops a Matlab computation
...	continuation on the next line of the script