Elementary Mathematical functions

MATLAB has several built-in functions, such as square root, sine, cosine, exponential, etc., functions.

Elementary math functions.

Type "help elfun" (elementary math functions) in the Command window

round(x)   Rounds x to the nearest integer
floor(x)   Rounds x down to nearest integer
ceil(x)   Rounds x up to nearest integer
rem(y,x)   Remainder after dividing y by x (eg: remainder of 17/3 is 2)
sign(x)   Returns -1 if x; returns 0 if x=0; returns 1 if x>0.
rand or **rand**(1)   Generates a random number between 0 and 1
exp(x)   Exponential function e^x
log(x)   Natural logarithm function, y=lnx (where e^y=x)
sqrt(x)   Square root function,
abs(x)   Absolute value function,
sin(x)   sine function sinx
cos(x)   cos function cosx
tan(x)   tan function tanx

Data analysis and statistics functions

- [val idx]=**max**(X) - returns **maximum** value and its **index** from a vector.
- If X is a matrix, a row vector containing the maximum element from each column is returned.

- >> x = [1, 5, 3; 2, 4, 6]; y = [10,2,4; 1, 8, 7];
- >> **max**(x,y) - Each element in the resulting matrix contains the maximum value from the corresponding positions in x and y.

- Similarly for **min()** function.

Data analysis and statistics functions

- **mean**(x)- Computes the mean value (or average value) of a vector x

- **median**(x) -Finds the median of the elements of a vector x

- **mode**(x)- Finds the value that occurs most often in an array

- **std**(x) Computes the standard deviation of the values in a vector x

- **var**(x) Calculates the variance of the data in x

Sorting functions

- **sort**(x) -Sorts the elements of a vector x into ascending order

- **sort**(x,**'descend**')- Sorts the elements in descending order (column wise for matrix)

- **sortrows**(x) -Sorts the rows in a matrix in ascending order based on the values in the first column, and keeps each row intact

- **sortrows**(x,n) - Sorts the rows in a matrix on the basis of the values in column n

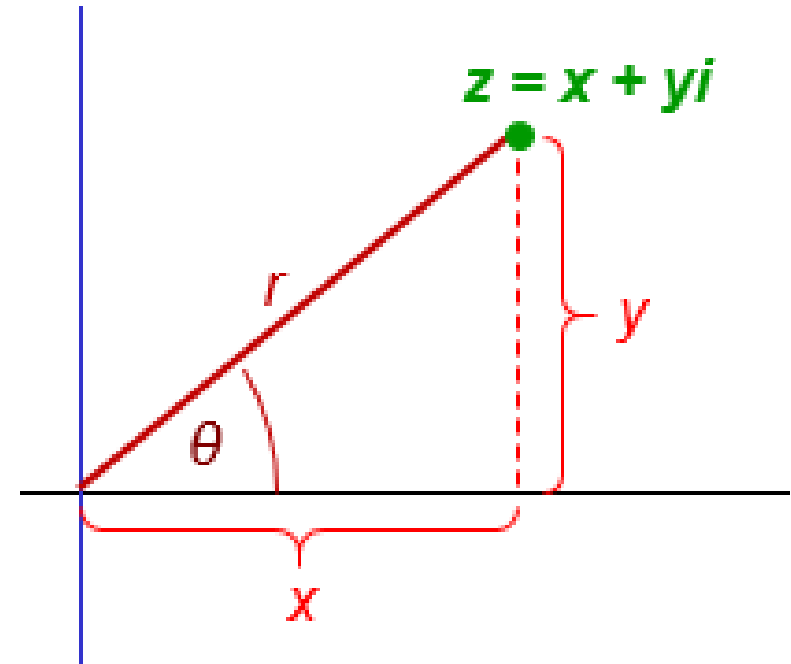# Convert Complex Number from Rectangular Form to Polar (Trigonometric) Form

$z = x + yi$ (rectangular form)

$$r = |z| = \sqrt{x^2 + y^2}$$

$$x = r\cos\theta$$

$$y = r\sin\theta$$

$z = r(\cos\theta + i\sin\theta)$ (polar form)

Complex numbers

Function	Description	Example
i,j	Imaginary unit. As the basic imaginary unit SQRT(-1), i and j are used to enter complex numbers. For example, the expressions 3+2i, 3+2*i, 3+2j, 3+2*j and 3+2*sqrt(-1) all have the same value.	>>z=2+4i >>z=2+4j
abs	abs(x) is the absolute value of the elements of x. When x is complex, abs(x) is the complex modulus (magnitude) of the elements of X.	>>z=2+4i >>abs(z)
angle	Phase angle. angle(z) returns the phase angles, in radians	>>z=2+4i >>angle(z)
imag	Complex imaginary part. imag(z) is the imaginary part of z.	>>z=2+4i >>b=imag(z)
real	Complex real part. real(z) is the real part of z.	>>z=2+4i >>a=real(z)
conj	Complex conjugate. conj(x) is the complex conjugate of x.	>>z=2+4i >>z_con=conj(z)
complex	Construct complex result from real and imaginary parts. c = complex(a,b) returns the complex result A + Bi	>>a=2; >>b=3; >>z=complex(a,b)

Discrete mathematics

- **factor**(x) - Finds the prime factors of x.

- **gcd**(x,y) Finds the greatest common denominator of x and y.

- **lcm**(x,y) Finds the least common multiple of x and y.

- **rats**(x) Represents x as a fraction (1.5 as ½)

Discrete mathematics

- **factorial**(x) Finds the value of x factorial (x!).

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- **nchoosek**(n,k) Finds the number of possible combinations of k items from a group of n items.

- **primes**(x) Finds all the prime numbers less than x.

- **isprime**(x) Checks to see if x is a prime number. If it is, the function returns 1; if not, it returns 0.