Scilab: Mathematics Quick Reference

Common Operations

`x + y`	Sum of x and y
`x - y`	Difference of x and y
`x * y`	Product of x and y
`x / y`	Ratio of x and y
`x ** y`	x^y
`sqrt(x)`	$\sqrt{x}$
`abs(x)`	Absolute value of x
`exp(x)`	e^x
`log(x)`	$ln(x)$
`log2(x)`	$log_2(x)$
`log10(x)`	$log_{10}(x)$
`factorial(x)`	$x!$
`pmodulo(x,n)`	$x \mod n$

Components of Numbers

`int(x)`	Integer part of x
`round(x)`	Round x to nearest integer
`floor(x)`	$\lfloor x \rfloor$, greatest integer less or equal to x
`ceil(x)`	$\lceil x \rceil$, smallest integer greater or equal to x
`sign(x)`	Sign; 1 if $x > 0$, -1 if $x < 0$, 0 if $x = 0$
`complex(a,b)`	Define complex number $a + bi$
`conj(x)`	Complex conjugate of x
`real(x)`	Real part of complex number x
`imag(x)`	Imaginary part of complex number x
`fix(A)`	Matrix A with all entries rounded down

Calculus

`integrate('3*x','x',0,2)`	Definite integration
`derivat(poly([1 2 3],'x','c'))`	Derivative of polynomial

Sort

`gsort(A,'g','i')`	Sort A, increasing order
`gsort(A,'g','d')`	Sort A, decreasing order
`gsort(A,'lr','i')`	Sort rows of A, inc lexicographic order
`gsort(A,'lc','i')`	Sort columns of A, inc lexicographic order
`gsort(A,'lr','d')`	Sort rows of A, dec lexicographic order
`gsort(A,'lc','d')`	Sort columns of A, dec lexicographic order

Number Systems

`bin2dec('1011')`	Decimal value of binary string
`oct2dec('1032')`	Decimal value of octal string
`hex2dec('1F2E')`	Decimal value of hexadecimal string
`dec2bin(53)`	Binary value of decimal value
`dec2oct(53)`	Octal value of decimal value
`dec2hex(53)`	Hexadecimal value of decimal value

Set Operations

`union(A,B)`	Union of A and B, $A \cup B$
`intersect(A,B)`	Intersection of A and B, $A \cap B$
`setdiff(A,B)`	Set difference of A and B, $A - B$
`unique(A)`	Unique elements of A; underlying set

Statistics

`mean(v)`	Mean of elements in vector v
`median(v)`	Median of elements in vector v
`stdev(v)`	Standard deviation of elements in vector v

Updated January 27, 2019
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Random

`rand()`	Random decimal in interval $(0,1)$
`rand(m,n)`	$m \times n$ matrix with random entries
`int(rand(1)*n)`	Random integer from 0 to n

Boolean Tests

`isdef(x)`	Returns true if variable x is defined
`isempty(x)`	Returns true if x is empty matrix or list
`isequal(x,y)`	Returns true if $x = y$
`isvector(x)`	Returns true if x is vector
`isreal(x)`	Returns true if x is real number
`isinf(x)`	Returns true if x is infinite
`isnan(x)`	Returns true if x is "Not A Number"

Special Constants

`%pi`	π, 3.1415927
`%e`	e, 2.7182818
`%eps`	ε, 2.2×10^{-16}
`%i`	i, $\sqrt{-1}$
`%inf`	∞, $1/0$
`%nan`	not a number
`%t`	True
`%f`	False

Polynomials

`poly([1 2 3],'x','c')`	Polynomial $3x^2 + 2x + 1$
`poly([1 2 3],'x','r')`	Polynomial in x with roots $1, 2, 3$
`poly(spec(A),'x','r')`	Characteristic polynomial of matrix A
`roots(p)`	Roots of polynomial p

Discrete Math

`perms(v)`	All permutations of list v as matrix
`primes(x)`	Primes less than or equal to x as vector
`factor(x)`	Prime factors of x as vector

Trigonometry

`sin(x)`	$\sin(x)$, x in radians
`cos(x)`	$\cos(x)$, x in radians
`tan(x)`	$\tan(x)$, x in radians
`cot(x)`	$\cot(x)$, x in radians
`sec(x)`	$\sec(x)$, x in radians
`csc(x)`	$\csc(x)$, x in radians
`sind(x)`	$\sin(x)$, x in degrees
`cosd(x)`	$\cos(x)$, x in degrees
`tand(x)`	$\tan(x)$, x in degrees
`cotd(x)`	$\cot(x)$, x in degrees
`secd(x)`	$\sec(x)$, x in degrees
`cscd(x)`	$\csc(x)$, x in degrees
`asin(x)`	$\sin^{-1}(x)$, returns radians
`acos(x)`	$\cos^{-1}(x)$, returns radians
`atan(x)`	$\tan^{-1}(x)$, returns radians
`acot(x)`	$\cot^{-1}(x)$, returns radians
`asec(x)`	$\sec^{-1}(x)$, returns radians
`acsc(x)`	$\csc^{-1}(x)$, returns radians
`asind(x)`	$\sin^{-1}(x)$, returns degrees
`acosd(x)`	$\cos^{-1}(x)$, returns degrees
`atand(x)`	$\tan^{-1}(x)$, returns degrees
`acotd(x)`	$\cot^{-1}(x)$, returns degrees
`asecd(x)`	$\sec^{-1}(x)$, returns degrees
`acscd(x)`	$\csc^{-1}(x)$, returns degrees