Constants		
Name	Description	Value
e	Number e	2.71828182845905
i	Imaginary unit	$\sqrt{-1}$
π	Number pi	3.14159265358979

Units			
Symbol	Name	Category	Value
°	Degree	Angle	π/180
°C	Celcius	Temperature	
°F	Fahrenheit	Temperature	
°R	Réaumur	Temperature	
A	Ampere	Electric Current	
acre	Acre	Area	4046.8564224 m^2
amp	Ampere	Electric Current	
Angstrom	Angstrom	Length	$m/10^{10}$
atm	Atmosphere	Pressure	101,325 kg/m s^2
B	Byte	Information	8 bit
bar	Bar	Pressure	100,000 kg/m s^2
barn	Barns	Area	$m^2/10^{28}$
bit	Bit	Information	
bohr	Bohr	Length	52,918 m $/10^{11}$
BTU	British thermal unit	Energy	1055.05585262 kg m^2/s^2
byte	Byte	Information	8 bit
c	Speed of light	Velocity	299,792,458 m/s
C	Coulumb	Charge	A s
cal	Calorie	Energy	4.1868 kg m^2/s^2
cd	Candela	Luminous intensity	
cm	Centimeter	Length	m/100
coul	Coulumb	Charge	A s
day	Day	Time	86,400 s
deg	Degree	Angle	π/180
dm	Decimeter	Length	m/10
dpi	Dots per inch	Resolution	39.3700787401575/m
dyne	Dyne	Force	kg m/100,000 s^2
F	Farad	Capacitance	$A^2s^4/kg\ m^2$
farad	Farad	Capacitance	$A^2s^4/kg\ m^2$
ft	Foot	Length	0.3048 m
furlong	Furlong	Length	201.168 m
g	Gravitational acceleration	Viscosity, dynamic	9.80665 m/s^2
G	Gauss	Magnetic flux density	kg/ 10,000 $A*s^2$
gal	Gallon	Volume	0.0037854119678 m^3
gauss	Gauss	Magnetic flux density	kg/ 10,000 $A*s^2$
GB	Gigabyte	Information	8,000,000,000 bit
GHz	Gigahertz	Frequency	1000000000/s

Units			
Symbol	Name	Category	Value
GiB	Gibibyte	Information	8589934592 bit
GJ	Gigajoule	Energy	1,000,000,000 kg m^2/s^2
gm	Gram	Mass	kg/1000
GN	Giganewton	Force	1,000,000,000 kg m/s^2
GPa	Gigapascal	Pressure	1,000,000,000 kg/m s^2
GW	Gigawatt	Power	1,000,000,000 kg m^2/s^3
Gy	Gray	Dose	m^2/s^2
H	Henry	Induction	kg m^2/s^2A^2
hectare	Hectare	Area	10,000 m^2
henry	Henry	Induction	kg m^2/s^2A^2
hhp	Water horsepower	Power	746.043 kg m^2/s^3
hp	Horsepower	Power	745.69987158227 kg m^2/s^3
hr	Hour	Time	3600 s
Hz	Hertz	Frequency	1/s
in	Inch	Length	0.0254 m
J	Joule	Energy	kg m^2/s^2
joule	Joule	Energy	kg m^2/s^2
K	Kelvin	Temperature	
Ka	Kiloampere	Electric current	1000 A
katal	Katal	Catalytic activity	mol/s
kB	Kilobyte	Information	8000 bit
kcal	Kilocalorie	Energy	4186.8 kg m^2/s^2
kg	Kilogram	Mass	
kgf	Kilogram Force	Force	9.80665 kg m/s^2
kHz	Kilohertz	Frequency	1000/s
kiB	Kibibyte	Information	8192 bit
kip	Kip	Force	4448.2216152605 kg m/s^2
kJ	Kilojoule	Energy	1000 kg m^2/s^2
km	Kilometer	Length	1000 m
kmol	Kilomole	Substance	1000 mol
kN	Kilonewton	Force	1000 kg m/s^2
knot	Knot	Velocity	463/900 m/s
kPa	Kilopascal	Pressure	1000 kg/m s^2
kph	Kilometers per hour	Velocity	5/18 m/s
ks	Kilosecond	Time	1000 s
kV	Kilovolts	Potential	1000 m^2kg/s^3A
kW	Kilowatt	Power	1000 kg m^2/s^3
kΩ	Kiloohm	Resistance	1000 kg m^2/s^3A^2
L	Liter	Volume	$m^3/1000$
lb	Pound	Mass	0.45359237 kg
lbf	Pound force	Force	4.4482216152605 kg m/s^2
liter	Liter	Volume	$m^3/1000$
lm	Lumen	luminous intensity	cd
lux	Lux	Illuminance	cd/m^2

Units			
Symbol	Name	Category	Value
m	Meter	Length	
mA	Milliampere	Electric Current	A/1000
MB	Megabyte	Information	8,000,000 bit
mC	Millicoulumb	Charge	A s/1000
mF	Millifarad	Capacitance	$A^2s^4/1000$ kg m^2
mg	Milligram	Mass	kg/1,000,000
Mg	Megagram	Mass	1000 kg
mH	Millihenry	Inductance	kg $m^2/1000$ s^2A^2
MHz	Megahertz	Frequency	1,000,000/s
mi	Mile	Length	1609.344 m
MiB	Mebibytes	Information	8,388,608 bit
micron	Micrometer	Length	m/1,000,000
mile	Mile	Length	1609.344 m
min	Minute	Time	60 s
mJ	Millijoule	Energy	kg $m^2/1000$ s^2
MJ	Megajoule	Energy	1,000,000 kg m^2/s^2
mL	Millileter	Volume	m^3/1,000,000
mm	Millimeter	Length	m/1000
mmole	Millimole	Substance	mol/1000
mN	Millinewton	Force	kg m/1000 s^2
MN	Meganewton	Force	1,000,000 kg m/s^2
mol	Mole	Substance	
mole	Mole	Substance	
MPa	Megapascal	Pressure	1,000,000 kg/m s^2
mph	Miles per hour	Velocity	1397/3125 m/s
ms	Millisecond	Time	s/1000
mV	Millivolts	Potential	m^2kg/1000 s^3A
mW	Milliwatts	Power	kg $m^2/1000$ s^3
MW	Megawatts	Power	1,000,000 kg m^2/s^3
MΩ	Megaohm	Resistance	1,000,000 kg m^2/s^3A^2
N	Newton	Force	kg m/s^2
nA	Nanoampere	Current	A/1,000,000,000
nC	Nanocoulumb	Charge	A s/1,000,000,000
nF	Nanofarad	Capacitance	A^2s^4/1,000,000,000 kg m^2
nm	Nanometer	Length	m/1,000,000,000
ns	Nanosecond	Time	s/1,000,000,000
nV	Nanovolts	Potential	m^2kg/1,000,000,000 s^3A
nW	Nanowatts	Power	kg m^2/1,000,000,000 s^3
ohm	Ohm	Resistance	kg m^2/s^3A^2
oz	Ounce	Mass	0.028349523125 kg
pA	Picoampere	Electric current	$A/10^{12}$
Pa	Pascal	Pressure	kg/m s^2
pC	Picocoulumb	Charge	A $s/10^{12}$
pF	Picofarad	Capacitance	$A^2s^4/10^{12}$ kg m^2

Units			
Symbol	Name	Category	Value
pm	Picometer	Length	$m/10^{12}$
poise	Poise	Viscosity, dynamic	kg/10 m s
ps	Picosecond	Time	$s/10^{12}$
psf	Pounds per square foot	Pressure	47.8802589803358 kg/m s^2
psi	Pounds per square inch	Pressure	6894.75729316836 kg/m s^2
pV	Picovolts	Potential	$m^2kg/10^{12}$ s^3A
pW	Picowatts	Power	kg $m^2/10^{12}$ s^3
R	Rankine	Temperature	(5/9)K
rad	Radian	Angle	1
rev	Revolution	Angle	2π
s	Second	Time	
sec	Second	Time	
slug	Slug	Mass	14.5939029372064 kg
Smoot	Smoot	Length	1.7018 m
stokes	Stokes	Viscosity, kinematic	m^2/10,000 s
Sv	Sievert	Dose	m^2/s^2
t	Metric ton	Mass	1000 kg
T	Tesla	Magnetic flux density	kg/A s^2
TB	Terabyte	information	8,000,000,000,000 bit
tesla	Tesla	Magnetic flux density	kg/A s^2
TiB	Tebibyte	Information	8,796,093,022,208 bit
TJ	Terajoule	Energy	10^{12} kg m^2/s^2
TN	Teranewton	Force	10^{12} kg m/s^2
ton	Ton	Mass	907.18474 kg
tonf	Ton Force	Force	8896.443230521 kg m/s^2
tonne	Metric Ton	Mass	1000 kg
tonnef	Metric Ton Force	Force	9806.65 kg m/s^2
torr	Torr	Pressure	133.322368421053 kg/m s^2
V	Volts	Potential	m^2kg/s^3A
volt	Volts	Potential	m^2kg/s^3A
W	Watt	Power	kg m^2/s^3
watt	Watt	power	kg m^2/s^3
yd	Yard	length	0.9144 m
yr	Year	Time	31,556,925.975 s
μA	Microampere	Current	A/1,000,000
μC	Microcoulumb	Charge	A s/1,000,000
μF	Microfarad	Capacitance	A^2s^4/1,000,000 kg m^2
μg	Microgram	Mass	kg/1,000,000
μH	Microhenry	Inductance	kg m^2/1,000,000 s^2A^2
μm	Micrometer	Length	m/1,000,000
μmol	Micromole	Substance	mol/1,000,000
μN	Micronewton	Force	kg m/1,000,000 s^2
μs	Microsecond	Time	s/1,000,000
μV	Microvolts	Potential	m^2kg/1,000,000 s^3A

Units			
Symbol	Name	Category	Value
µW	Microwatt	Power	kg m^2/1,000,000 s^3
Ω	Ohm	Resistance	kg m^2/s^3A^2

Functions	
Name	Description
abs(number)	Absolute value
acos(number)	Inverse cosine
acosh(number)	Inverse hyperbolic cosine
acot(number)	Inverse cotangent
acoth(number)	Inverse hyperbolic cotangent
ainterp(x-vector,y-vector,number)	Akima-spline interpolated value at number for data vector x-vector and y-vector of the same size
alg(matrix,number,number)	Algebraic addition to matrix
arccossec(number)	Inverse cosecant
arcsec(number)	Inverse secant
arg(number)	Angle from the real axis to the complex number
asin(number)	Inverse sine
asinh(number)	Inverse hyperbolic sine
atan(number)	Inverse tangent
atanh(number)	Inverse hyperbolic tangent
augment(…)	Returns an array formed by placing arguments left to right. Arguments are arrays having the same number of columns, or they are scalars and column vectors.
cinterp(x-vector,y-vector,number)	Returns a cubic spline interpolated value at x for data vectors x-vector and y-vector of the same size
col(matrix,number)	Returns the column of the matrix/vector
cols(matrix)	Returns the number of columns of the matrix/vector
concat(…)	Concatenating strings
cos(number)	Cosine
cosh(number)	Hyperbolic cosine
cot(number)	Cotangent
coth(number)	Hyperbolic cotangent
csc(number)	Cosecantc
csch(number)	Hyperbolic cosecant
csort(matrix/vector,number)	Returns a matrix/vector formed by rearranging rows until specified column is in ascending order
det(matrix)	Matrix determinate
dfile(filename)	Remove file from file system
diag(vector)	Returns a matrix containing on its diagonal the elements of vector
diff(expression,variable)	Differentiate (dx/dy)
diff(expression,variable)	Differentiate (d^2x/dy^2)
el(matrix,number,number)	Return the element of the matrix m_{ij}

Functions	
Name	Description
error(string)	Shows standard SMath Studio error tip with text form the function argument
eval(expression)	Converts analytical expression to the numeric notation
exp(number)	Exponential function e raised to the power number
expand(expression)	Simplify expression
findstr(string,string)	Returns vector of start position of second string insider first string. Returns -1 if no match found
for(increment,vector,body)	For loop
for(increment,condition,action,body)	For loop
Gamma(number)	Gamma function calculation
identity(number)	Returns an nxn identity matrix. n must be a positive integer
if(condition,true,false)	Returns the "true statement" if logical "condition statement" is true (non-zero). "false statement" otherwise.
Im(number)	Imaginary part of complex number
importData(filename)	Returns a matrix of loaded data from specified file using default parsing parameters
importData(filename, decimalSymbol, argumentsSeparator, columnsDelimiter, fromRow, toRow, fromColumn, toColumn, isSymbolic	Returns a matrix of loaded data from specified file. Function allows to to work with 1-9 count of arguments specified. Digit 0 (zero) can be used for the arguments (except filename) to get the built in default values.
int(express,number,number,variable)	Definite integral
invert(matrix/number)	Inverted value
IsString(argument)	Returns 1 if specified argument is a string. 0 otherwise
length(matrix/vector)	The number of elements in matrix or vector. Returns a scalar
line(…)	Draws a line for a subroutine
linterp(x-vector,y-vector,number)	Returns a linearly interpolated value at number for data vectors x-vector and y-vector of the same size.
ln(number)	Natural logarithm
log(number,number)	Logarithm
log10(number)	Base 10 logarithm of number
mat(…)	*Matrix*
matrix(rows,cols)	*Returns a matrix of size specified filled with zeros*
max(matrix/vector)	*Returns the largest element of matrix/vector. If any value is complex returns max(Re(…))+i*max(Im(…))*
min(matrix/vector)	*Returns the smallest element of matrix/vector. If any value is complex returns min(Re(…))+i*min(Im(…))*
minor(matrix,number,number)	Minor of matrix
mod(number,number)	Returns the remainder on dividing the first argument by the second. Arguments must be real
norm1(matrix)	Returns the L1 norm of the matrix
norme(matrix)	Returns the Euclidean norm of the matrix

Functions	
Name	Description
normi(matrix)	Returns the infinite norm of the matrix
nthroot(number,number)	Root
num2str(expression)	Converts specified math expression to a string
numden(expression)	Returns a vector of numerator and denominator values of expression
perc(number,number)	Percentage
pol2xy(number,number)	Converts the polar coordinates of a point in 2D space to rectangular coordinates
polyroots(vector)	Returns all the roots of the polynomial whose coefficients are in argument vector
product(expression, number, number,variable)	Iterated product
random(number)	The random number from 0 to the arguments value
range(number,number)	Returns a vector of values within the specified range with step equal to 1
range(number,number,step)	Returns a vector of values within the specified range with step equal to step
rank(matrix)	Matrix rank
Re(number)	Returns the real part of complex number
reverse(matrix/vector)	Reverses the order of rows of matrix or of element in a vector
rfile(filename)	Read math expression from file
round(number,number)	Rounds the real number x to n places)
row(matrix/vector,number)	Returns the row of the matrix/vector
rows(matrix/vector)	Number of rows of the matrix/vector
rsort(matrix/vector,number)	Returns a matrix formed by rearranging columns until specified row is in ascending order
sec(number)	Secant
sech(number)	Hyperbolic secant
sign(number)	Returns 0 if x=0, 1 if x>0, and -1 otherwise. Argument must be a real number
sin(number)	Sine
sinh(number)	Hyperbolic sine
solve(expression,variable)	Returns real roots of the expression
sort(vector)	Returns a vector with the values sorted in ascending order
sqrt(number)	Square root
stack(…)	Returns an array formed by placing arguments top to bottom. Arguments are arrays having the same number of columns or they are scalars and column vectors.
str2num(string)	*Returns math expression formed by converting from specified string*
strlen(string)	*Returns the number of characters in specified string*
strrep(originalString,oldString, newString)	Replaces all occurrences of oldString within originalString with newString
submatrix(matrix,i_row,j_row,	Returns the submatrix consisting of elements in rows i_row

Functions	
Name	Description
i_col,j_col)	through j_row and columns i_col through j_col
substr(string,number,number)	Returns a substring of specified string. Second argument means index of start substring character position and third argument (if specified) show length of the result string
sum(expression,number,number, variable)	Summation
sys(…)	Equation systems
tan(number)	Tangent
tanh(number)	Hyperbolic tangent
tr(matrix)	Matrix trace. Sum of the element on the main diagonal (the diagonal from the upper left to the lower right) of a square matrix
transpose(matrix/vector)	Matrix transpose
trunc(number)	The integer part of a real number by removing the fractional part
vminor(matrix,number,number)	Returns submatrix of matrix excepting the specified row and column
wfile(expression,filename)	Write math expression to file. If file with filename existing function will overwrite it. Will return 1 if successful, 0 otherwise
while(condition,body)	Function of iterations. The cycle carries out a body while the condition is true. Important: in a body any quantity of expressions by means of function line(…) can be set.
xy2pol(number,number)	Converts the rectangular coordinates of a point in 2D space to polar coordinates.

Shortcut	
Keyboard key	Description
~	Logical Nol
!	Factorial
@	Insert a 2D plot
#	Insert text
%	-/+ Minus plus
^	Power
&	Logical And
|	Logical Or
\	√ Square root