Constants		
Name	Description	Value
c	Speed of light	299,792,458 m/s
e	Number e	2.7182818284590451
g	Gravitational acceleration	9.80665 m/s^2
G_N	Newtonian constant of gravitation	$6.6742867*10^{-11}$ $m^3/kg\ s^2$
h	Planck constant	$6.6260689633*10^{-34}$ kg m^2/s
i	Imaginary unit	$\sqrt{-1}$
k	Boltzmann constant	$1.380650424*10^{-23}$ kg $m^2/K\ s^2$
N_A	Avogadro's number	$6.022141510*10^{23}$ / mol
R	Gas constant	8.31447215 kg m^2/K mol s^2
π	Number pi	3.1415926535897931
μ_0	Magnetic constant	$4\pi*10^{-7}$ kg m/s^2 A^2

Units			
Symbol	Name	Category	Value
°	Degree	Angle	π/180
°C	Celcius	Temperature	
°F	Fahrenheit	Temperature	
°Ra	Rankine	Temperature	(5/9)K
°Re	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	5.291772108 m $/10^{11}$
BTU	British thermal unit	Energy	1055.05585262 kg m^2/s^2
byte	Byte	Information	8 bit
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	39.37007874015748/m
dyn	Dyne	Force	kg m/100,000 s^2
dyne	Dyne	Force	kg m/100,000 s^2
e	Elementary charge	Charge	$1.60217648740*10^{14}$ As

Units			
Symbol	Name	Category	Value
erg	Unit of energy/work	Energy	10^{-7} kg m^2/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	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
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
gon	Grad	Angle	π/200
GPa	Gigapascal	Pressure	1,000,000,000 kg/m s^2
grad	Grad	Angle	π/200
gram	Gram	Mass	kg/1000
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	745.6998715822702 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	Kilo-pounds	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	Knot	Velocity	463/900 m/s

Units			
Symbol	Name	Category	Value
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
ksf	Kilo-pounds per square feet	Pressure	47880.2589803358 kg/m s^2
ksi	Kilo-pounds per square inch	Pressure	6894757.29316836 kg/m s^2
kV	Kilovolts	Potential	1000 m^{2}kg/s^{3}A
kW	Kilowatt	Power	1000 kg m^2/s^3
kΩ	Kiloohm	Resistance	1000 kg m^2/s^{3}A^2
L	Liter	Volume	m^3/1000
lb	Pound	Mass	0.45359237 kg
lbf	Pound force	Force	4.4482216152605 kg m/s^2
lbmol	Pount-mole	Substance	453.59237 mol
liter	Liter	Volume	m^3/1000
lm	Lumen	luminous intensity	cd
lx	Lux	Illuminance	cd/m^2
m	Meter	Length	
mA	Milliampere	Electric Current	A/1000
MB	Megabyte	Information	8,000,000 bit
mC	Millicoulumb	Charge	A s/1000
m_e	Electron mass	Mass	9.1093821545*10^{-31} kg
mF	Millifarad	Capacitance	A^{2}s^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^{2}A^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
mmol	Millimole	Substance	mol/1000
m_n	Neutron mass	Mass	1.67492721184*10^{-27} kg
mN	Millinewton	Force	kg m/1000 s^2
MN	Meganewton	Force	1,000,000 kg m/s^2
mol	Mole	Substance	
mole	Mole	Substance	
m_p	Proton mass	Mass	1.67262163783*10^{-27} kg
MPa	Megapascal	Pressure	1,000,000 kg/m s^2

Units			
Symbol	Name	Category	Value
mph	Miles per hour	Velocity	1397/3125 m/s
ms	Millisecond	Time	s/1000
m_u	Unified atomic mass	Mass	$1.6605388628*10^{-27}$ kg
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
P	Poise	Viscosity, dynamic	kg/10 m s
pA	Picoampere	Electric current	$A/10^{12}$
Pa	Pascal	Pressure	$kg/m\ s^2$
pC	Picocoulumb	Charge	$A\ s/10^{12}$
pF	Picofarad	Capacitance	$A^2s^4/10^{12}\ kg\ m^2$
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	$kg\ m^2/10^{12}\ s^3$
rad	Radian	Angle	1
radpm	Radians per minute	Frequency	1/60 s
rev	Revolution	Angle	2π
rph	Revolutions per hour	Angular velocity	π/1800 s
rpm	Revolutions per minute	Angular velocity	π/30 s
s	Second	Time	
sec	Second	Time	
slug	Slug	Mass	14.5939029372064 kg
Smoot	Smoot	Length	1.7018 m
St	Stokes	Viscosity, kinematic	$m^2/10{,}000$ s
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

Units			
Symbol	Name	Category	Value
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	133.3223684210526 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
µW	Microwatt	Power	kg m^2/1,000,000 s^3
Ω	Ohm	Resistance	kg m^2/s^3A^2

Name	Description
abs(number)	Absolute value
acos(number)	Inverse cosine
acosh(number)	Inverse hyperbolic cosine
acot(number)	Inverse cotangent
acoth(number)	Inverse hyperbolic cotangent
acsc(number)	Inverse cosecant
ainterp(x-vector, y-vector, number)	Akima-spline interpolated value at number for data vector x-vector and y-vector of the same size (Vector is a column matrix)
alg(matrix, number, number)	Cofactor (algebraic signed minor) of matrix
arg(number)	Angle from the real axis to the given complex number
asec(number)	Inverse secant
asin(number)	Inverse sine
asinh(number)	Inverse hyperbolic sine
atan(number)	Inverse tangent

Name	Description
atanh(number)	Inverse hyperbolic tangent
augment(…)	Returns a matrix formed by placing arguments left to right. Arguments are matrices or column vectors having the same number of rows, or they are scalars and row vectors.
break	Terminates the execution of the nearest enclosing loop in which it appears. Control passes to the statement that follows the terminated statement, if any.
cinterp(x-vector, y-vector, number)	Returns a cubic spline interpolated value at number for data vectors x-vector and y-vector of the same size (Vector is a column matrix)
col(matrix, number)	Returns the specified column of the matrix/vector
cols(matrix)	Returns the number of columns of the matrix/vector
concat(…)	Concatenating strings
continue	Ends the current iteration of a loop
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
description("name")	Returns Description text of the definition "name" using current language
det(matrix)	Matrix determinate
dfile(filename)	Remove file from file system
diag(vector)	Returns a square matrix containing on its diagonal the elements of vector (Vector is a column matrix)
diff(2)(expression, variable)	Differentiate (dx/dy)
diff(3)(expression, variable)	Differentiate (d^2x/dy^2)
el(matrix, vector)	Returns the specified element of the vector
el(matrix, number, number)	Return the element of the matrix m_{ij}
error(string)	Shows standard SMath Studio error tip with text form the function argument
eval(expression)	Converts the given expression from symbolic to numeric notation
exp(number)	Exponential function e raised to the power number
expand(expression)	Simplify expression
exportCell(value, filename, sheetname, row, column)	Exports data to the Excel cell.
findrows(matrix,expression,number)	Retrieves all rows of matrix where expression is specified in column number. Returns 0 if no matches found.
findstr(string, string)	Returns vector of start position of second string insider first string. Returns -1 if no match found
for(3)(increment, vector, body)	For loop

Name	Description
for(4)(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
importCell(filename, sheetName, row, column)	Imports data from the Excel cell
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 can be used with 1-9 of the 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
IsDefined("expression")	Returns 1 if all variables and functions in the expression is defined, 0 - otherwise
IsString(argument)	Returns 1 if specified argument is a string. 0 otherwise
Jacob(vector,vector)	Returns the Jacobian matrix of the vector function
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. (Vector is a column matrix)
ln(number)	Natural logarithm
log(number, number)	Logarithm of number to the specified base (second number)
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
normi(matrix)	Returns the infinite norm of the matrix
nthroot(number, number)	Root

Name	Description
num2str(expression)	Converts specified math expression to a string
numden(expression)	Returns a 2 element vector of numerator and denominator values of expression
perc(number, percent)	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(2)(number, number)	Returns a vector of values within the specified range with step equal to 1
range(3)(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
roots(vector1,vector2)	Finds roots for system of nonlinear equations. Returns the values of vector2 to make the set of functions vector1 equal to zeros
roots(vector1,vector2,vector3)	Finds roots for system of nonlinear equations according to specified approaches vector3. Returns the value of vector2 to make the set of functions vector1 equal to zeros
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(2)(expression, variable)	Returns real roots of expression with respect to variable
solve(4)(expression, variable, lower, upper)	Returns real roots of expression with respect to variable in the interval between lower and upper
sort(vector)	Returns a vector with the values sorted in ascending order
sqrt(number)	Square root
stack(…)	Returns a matrix formed by placing arguments top to bottom. Arguments are matrices or column vectors having the same number of columns, or they are scalars and column vectors.
str2num(string)	Returns math expression formed by converting from specified string

Name	Description
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, i_col,j_col)	Returns the submatrix consisting of elements in rows i_row through j_row and columns i_col through j_col
substr(string, number)	Returns a substring of string. Where number is a starting character position of substring.
substr(string, number1, number2)	Returns a substring of string. Where number1 is a starting character position of substring; number2 is a length of result string.
sum(matrix)	Summation of the vector/matrix elements
sum(matrix, increment, number1, number2)	Summation of an expression “matrix” in summation variable “increment” with lower limit “number1” and upper limit “number2”
sys(…)	Multiple values
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
trace(…)	Returns a string containing the value of the arguments with output order and surrounding text specified by first argument. Output values in the Output Window. Specifying the first text argument is optional.
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
“	Insert text
‘	Insert units
~	Boolean Not
!	Factorial
@	Insert a 2D plot
$	Insert operator
%	-/+ Minus plus

^	Power
&	Boolean And
*	Insert multiplication
(	Insert parenthesis
[	Element of a matrix or vector
]	Insert line
|	Boolean Or
\	√ Square root
.	Literal subscript in variable, function, unit name
Ctrl+0	Boolean Greater than or Equal to
Ctrl+1	Matrix Transpose
Ctrl+3	Boolean Not Equal to
Ctrl+8	Matrix Multiplication
Ctrl+9	Boolean Less than or Equal to
Ctrl+=	Boolean Equal
Ctrl+w	Insert Units dialog box
Ctrl+e	Insert Function dialog box
Ctrl+t	Insert blank image for drawing
Ctrl+y	Redo
Ctrl+o	Open File dialog box
Ctrl+p	Print File dialog box
Ctrl+\	Insert nth root
Ctrl+a	Select all (On page or in selected control)
Ctrl+s	Save As dialog box
Ctrl+g	Pressing after a character replace with Greek equivalent
Ctrl+z	Undo
Ctrl+x	Cut
Ctrl+c	Copy
Ctrl+v	Paste
Ctrl+n	New Page
Ctrl+m	Insert Matrix dialog box
Ctrl+.	Insert evaluate symbolically
Ctrl+Shift+p	Insert pi
Ctrl+Shift+z	Insert infinity
Ctrl+Enter	Insert line break in text region
F8	Change multiple variable, function, unit names
F9	Recalculate
Ctrl+F4	Close Page
Ctrl+F6	Change Page
End or Shift+Num_1	Go to bottom
Home or Shift+Num_7	Go to top
Page Up or Shift+Num_9	Page up
Page Down or Shift+Num_3	Page down