

# Mathematical Library Functions

The following is a list of available mathematical functions. Note that functions can operate on numbers, parameters, variables, and arithmetic expressions. An arithmetic expression is a combination of numbers, parameters, or variables. For example,  $\text{ABS}(3*X-A)$  where  $X$  is a previously defined variable and  $A$  is a previously defined parameter.

**Arithmetic Functions**

$\text{ABS}(X)$	Compute the absolute value of a number.
$\text{DIM}(X,Y)$	Compute the positive difference (i.e., $x - \min(x,y)$ ).
$\text{EXP}(X)$	Compute the exponential of a number.
$\text{IND}(X,Y)$	Compute the mathematical indicator function (i.e., all $X$ equal to $Y$ are set to 1, all $X$ not equal to $Y$ set to 0).
$\text{MAX}(X,Y)$	Compute the maximum of two numbers.
$\text{MIN}(X,Y)$	Compute the minimum of two numbers.
$\text{MOD}(X,Y)$	Compute the modulo (i.e., the remainder of $x/y$ ).
$\text{SQRT}(X)$	Compute the square root of a number.

**Logarithmic Functions**

$\text{LN}(X)$ or $\text{LOG}(X)$	Compute the natural logarithm of a number.
$\text{LOG10}(X)$	Compute the base 10 logarithm of a number.
$\text{LOG2}(X)$	Compute the base 2 logarithm of a number.

**Type Conversion Functions**

$\text{FRACT}(X)$	Compute the fractional portion of a number.
$\text{INT}(X)$	Compute the integer portion of a number.
$\text{MSD}(X)$	Compute the most significant digit of a number.
$\text{ROUND}(X)$	Round to the closest integer of a number.
$\text{SIGN}(X)$	Compute the sign of a number.

**Base Conversion Functions**

$\text{DECOCT}(X)$	Perform a decimal to octal conversion.
$\text{OCTDEC}(X)$	Perform an octal to decimal conversion.

**Error Functions**

$\text{ERF}(X)$	Compute the error function.
$\text{ERFC}(X)$	Compute the complementary error function.

**Gamma and Beta Functions**

$\text{BETA}(A,B)$	Compute the complete beta function.
$\text{BETAI}(A,B)$	Compute the incomplete beta function.
$\text{GAMMA}(X)$	Compute the gamma function.
$\text{GAMMAI}(X,A)$	Compute the incomplete gamma function.
$\text{GAMMAIC}(X,A)$	Compute the complementary incomplete gamma function.

GAMMAIP(X,A)	Compute an alternate definition of the incomplete gamma function.
GAMMAR(X)	Compute the reciprocal gamma function.
LNBETA	Compute the log beta function.
LOGGAMMA(X)	Compute the log gamma function.
TRICOMI(X,A)	Compute the Tricomi incomplete gamma function.

**Chebyshev Polynomial Functions**

CHEB0(X)	Compute a Chebyshev polynomial of the first kind (order 0).
CHEB1(X)	Compute a Chebyshev polynomial of the first kind (order 1).
CHEB2(X)	Compute a Chebyshev polynomial of the first kind (order 2).
CHEB3(X)	Compute a Chebyshev polynomial of the first kind (order 3).
CHEB4(X)	Compute a Chebyshev polynomial of the first kind (order 4).
CHEB5(X)	Compute a Chebyshev polynomial of the first kind (order 5).
CHEB6(X)	Compute a Chebyshev polynomial of the first kind (order 6).
CHEB7(X)	Compute a Chebyshev polynomial of the first kind (order 7).
CHEB8(X)	Compute a Chebyshev polynomial of the first kind (order 8).
CHEB9(X)	Compute a Chebyshev polynomial of the first kind (order 9).
CHEB10(X)	Compute a Chebyshev polynomial of the first kind (order 10).

**Bessel Functions**

BESS0(X)	Compute a Bessel function of the first kind (order 0).
BESS1(X)	Compute a Bessel function of the first kind (order 1).

**Experiment Design**

BINPAT(X,COL)	Used to generate Yates design matrices.
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**Fractals**

JULIA(X)	Used to generate Julia sets.
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