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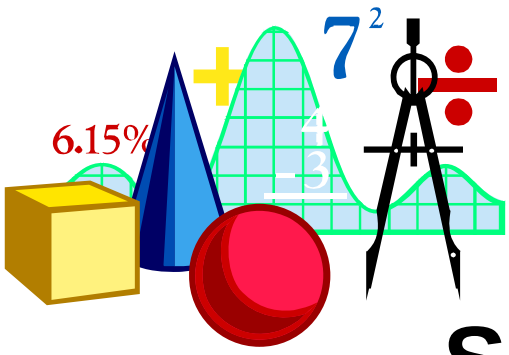

SciMath™

Advanced C/C++ Scientific Math Library

SciMath V.7.1 is the most advanced C/C++ scientific math library today. SciMath is suitable for developing applications in all areas of science and engineering such as Math, Physics, Chemistry and Statistics. SciMath features over 500 powerful mathematical functions. SciMath is sold in an already compiled format (.lib file) similar to the libraries used by your compiler. To start using SciMath you simply link your application with SciMath.lib file. Then you can call any one of the SciMath powerful functions directly from your applications. SciMath can be viewed as an extension of your compiler's math library. SciMath also includes a SciMath User's Manual describing each function with clarity and detail. SciMath is available for a variety of popular 16 and 32 bit C/C++ compilers under Windows 16 and 32 bit, Windows 95, Windows NT, and DOS 16 and 32 bit operating systems. SciMath also supports most of the popular DOS extenders.

Areas of Math Supported by SciMath V.7.1

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SciMath is Royalty Free!!!

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Supported Compilers:

- Watcom C/C++ 16 and 32 bit
- Microsoft Visual C/C++ 16 and 32 bit
- Borland C/C++ 16 and 32 bit

Supported Operating Systems and Extenders:

- DOS 3.0, OS/2 or Windows 16 and 32 bit, Windows 95/98/2000/NT/XP or higher
- Rational DOS/4G and DOS/4GW 16 and 32 bit DOS extenders
- Microsoft/WATCOM/BORLAND C/C++ DOS Extenders

Supported Hardware:

- IBM PC/AT/OS2, 286, 386, 486, Pentium or higher

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SciMath
Sample of Selected Library Functions

The following is a partial list of some of the powerful functions included in SciMath.lib.

Linear Algebra:
mtlsbs: Linear system solver (banded)
gjmtxl: Linear equation solver using Gauss-Jordan
mtudec: Banded unsymmetric matrix, LU decomposition
mtvmul: Matrix vector multiplication (banded)
lbacks: Linear equation solver using back-substitution
mtcond: Condition estimation of LDL decomposition
lnchol: Cholesky decomposition
mtbdec: Banded unsymmetric matrix decomposition
linqso: linear system solver, QR back-substitution

Special Functions:
catlog: Complex natural logarithm
gamma: Gamma function (real)
beintc: I, modified Bessel functions of complex argument and integer order
bejntc: J, complex argument Bessel functions of integer order
spbeta: Computes beta function
errfun: Error function

Roots/Zeros/Nonlinear Functions:
czerop: Zeros of complex polynomials
rsreal: Real single root
rtnewt: Solves nonlinear systems using Newton-Raphson
rzernl: Computes nonlinear equation zeros
rzrnlj: Computes nonlinear equations zeros using Jacobian
rtller: Computes real/complex root of a function
rterop: Computes zeros of real polynomials

Integration/Quadrature:
qsjacw: Gauss-Jacobi Quadrature
qgausq: Weights and Abscissa of Gauss Quadrature
qsexaw: Gauss-Hermite Quadrature
quslog: Gauss Quadrature
qdntgr: Integration using relative error
qdegps: Piecewise smooth function integrator
qubspl: Cubic Spline integration (tabulated)
qdtgbc: Main integration function (single quadrature algorithm), with boundary conditions
qthree: Triple integral (3 dimensional)

Approximation/Interpolation/Extrapolation:
msmshd: Computes locally uniform mesh
ctsqls: Complex linear equations, Least Squares solution
intplt: Interpolation of a two dimensional polynomial
sderiv: Selected derivative, basis spline computation
sbeval: Derivative basis spline computation
intpol: Interpolation of a polynomial
sinteg: Basis spline integration
csplit: Cubic spline fit
ssqfit: Least Squares B spline fit, discrete data
ssqwfi: Weighted B spline fit, discrete data
chbfit: Chebyshev polynomial fit
chbint: Integrate a Chebyshev fitted function
srrsca: Computes estimate error in B spline
spumsh: Computes locally uniform mesh for a B spline
uuncap: Approximation of a mesh, uniform approximation

Random Numbers:
raarit: Random deviate bit pattern generator
genrep: Generate floating point number
ranlec: Generate Random number using L'Ecuyer with shuffle
ranexp: Generate exponential random deviate
gamdis: Gama-law distributed random deviate
posran: Poisson distributed random deviate
ranmrt: Monte Carlo recursive multidimensional Integration

Eigensystems:
mtigen: Eigen vectors and values of a real matrix
eighes: Eigen values of a Hessenberg matrix
mtgenc: Complex general eigen value problem solver
eigsmt: Computes eigen vectors and values of a symmetric matrix
eigsor: Sort eigen values

Integral Equations:
solvol: Solves Volterra equations of the second kind
solfrd: Solves Fredholm equations of the second kind

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SciMath™
Sample of Selected Library Functions (Continued)

Transforms and Spectrum Analysis
fftdat: Fast Fourier Transform, real data
fftinv: Inverse Fast Fourier Transform , Real Data
fftltp: FFT, Multidimensional , complex data
fftmpx: Fast Fourier Transform , Singleton method
fftplx: Fast Fourier Transform complex data
fftcpx: Inverse Fast Fourier Transform complex data
fftcov: Data convolution/deconvolution using FFT
fftcor: Data Correlation/Autocorrelation using FFT
entmem: Compute linear prediction (MEM) coefficients
waveml: Compute multidimensional Wavelet transform

Utility Functions:
veybin: Move integer vector (backward)
vepbrn: Move double precision vector (forward)
vepfin: Move integer Vector (backward)
vlrang: Vector element boundary
getpol: Orthogonal polynomials sum
sorstr: Straight sort of an array
sorquk: Quick sort an array
sorhep: Heap sort an array
vetest: Test vector: if monotone increasing or decreasing

Differential Equations:
odnivp: Initial Value Problem, Ordinary Differential Equation Solver
odeivp: Stiff ODE (Ordinary Differential Equation) initial value problem
odfhrk: Integrate ODE by fourth order Runge-Kutta
ododea: Integrate ODE using Runge-Kutta with adaptive stepwise monitoring

Optimization/Minimization/Maximization:
opquaf: Compute local minima using quadratic programming
mmfbmg: General optimization with gradient
optmul: Multidimensional minimization of a function
optscr: Compute minima of a function, section serach
mmfmgh: General optimization with gradient and Hessian
mmlqja: Nonlinear least squares using Jacobian

Optimization/Minimization/Maximization: (Continued)
mmsimp: Maximization of a linear function
mmlljs: Nonlinear least squares using Jacobian, simple bounds
mmlqjp: Nonlinear least squares using Jacobian (in sections)
mmfmin: General Optimization
mmnllq: Nonlinear least squares
optdrt: Compute minima using derivative

Partial Differential Equations:
pdlver: Main Partial Differential Equation Solver
pdeovx: Solution of elliptic PDE using successive over-relaxation
pdemlg: Solution of elliptic PDE using multigrid method
pdenlm: Solution of nonlinear elliptic PDE using multigrid method

Statistics:
stchit: Performs chi-s test for the case of difference between two sets of data
stksmd: Kolmogorov-Smirnov test , data and model
stkstd: Kolmorov-Smirnov test (two sets of data)
sttabt: Entropy measure for contingency table analysis
stcore: Correlation between two sets of data (Pearson's method)
strcor: Rank correlation for two sets of data (Spearman's method)
strank: Moves ranks into array elements
stlega: Fits a Legendre polynomial
stline: Fits data to a straight line
stmomt: Computes moments of data
stmarq: Marquard's nonlinear least-squares fit
ststst: Computes difference of means (Student's test)
stvard: Computes variance and mean of data
stpoft: Fits a polynomial function
stksmf: Kolmogrov-Smirnov main probability function
stgssm: Generate Golay-Savitzky coefficients
stkend: Correlation for two sets of data (Kendal's tau)
stcken: Contingency analysis (Kendal's tau)
stlsgn: Linear least-squares fit (general form)
stgaus: Fit data to a Sum of Gaussians

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