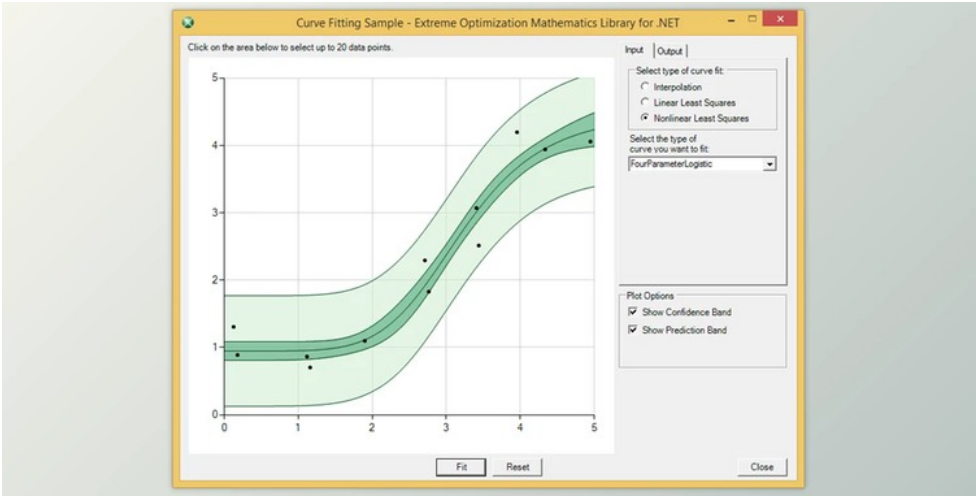


Extreme Optimization Numerical Libraries for .NET v8.1.9 (12 Sep 2022)

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The Extreme Optimization Numerical Libraries for .NET are an assortment of general-purpose mathematical and statistical classes designed specifically for Microsoft's Microsoft .NET Framework.

Extreme Optimization Numerical Libraries for .NET is a collection of general-purpose math and statistical courses. It is a complete statistical and technical computing platform built on the Microsoft .NET platform. It includes the math library, vector and matrix library, and a statistics library in a straightforward package.

Extreme Optimization Numerical Libraries for .NET Great Features:

- Easy to use even for the mathematically not-so-inclined.
- Excellent performance through optimized implementation of the best algorithms.
- Powerful enough to satisfy the most demanding power user.
- Intuitive object model. The objects in the Extreme Optimization Numerical Libraries for .NET and the relationships between them match our everyday concepts.
- Cross-platform. Works out-of-the-box on 32 and 64-bit platforms, .NET versions 1.1, 2.0, 3.0, and 3.5.
- General
 - Machine floating-point constants.
 - Common mathematical constants.
 - It extended elementary functions.
 - Algorithm support functions: iteration, tolerance, convergence tests.
- Complex numbers
 - Double-precision complex number value type.
 - Overloaded operators for all arithmetic operations.
 - Static operator functions for languages that don't support operator overloading.
 - Extension of functions in the System.Math to the complex argument.
 - Support for complex infinity and complex Not-a-Number (NaN).
 - Complex vector and matrix classes.
- Numerical integration and differentiation
 - Numerical differentiation.
 - Numerical integration using Simpson's rule and Romberg's method.
 - Non-adaptive Gauss-Kronrod numerical integrator.
 - Adaptive Gauss-Kronrod numerical integrator.
 - Integration over infinite intervals.
 - Optimizations for functions with singularities and discontinuities.
 - Six integration rules to choose from, or provide your own.
 - Integration in 2 or more dimensions.
- Curve fitting and interpolation
 - Interpolation using polynomials, cubic splines, piecewise constant, and linear curves.
 - Linear least squares fit using polynomials or arbitrary functions.
 - Nonlinear least squares using predefined functions or your own.
 - Predefined nonlinear curves: exponential, rational, Gaussian, Lorentz, 4 and 5 parameter logistic.
 - I weighted least squares with four predefined weight functions.
 - I am scaling curve parameters.
 - Constraints on curve parameters.
- Curves
 - An object-oriented approach to working with mathematical curves.

所有软件资源

100%安全

已检测 无病毒 无篡改

去预览

标签

- Components
- Other
- .Net

- Methods for: evaluation, derivative, definite integral, tangent, roots.
- Many basic types of curves: constants, lines, quadratics, polynomials, cubic splines, Chebyshev approximations, and linear combinations of arbitrary functions.
- Solving equations
 - Real and complex roots of polynomials.
 - Roots of arbitrary functions: bisection, false positive, Dekker-Brent, and Newton-Raphson methods.
 - Systems of simultaneous linear equations.
 - Systems of nonlinear equations: Powell's hybrid 'dogleg' method, Newton's method.
 - Least squares solutions.
- Optimization
 - Optimization in 1 dimension: Brent's algorithm, Golden Section search.
 - The quasi-Newton method in N dimensions: BFGS and DFP variants.
 - Conjugate gradient method in N dimensions: Fletcher-Reeves and Polak-Ribière variants.
 - Powell's conjugate gradient method.
 - Downhill Simplex method of Nelder and Mead.
 - Levenberg-Marquardt method for nonlinear least squares.
 - Line search algorithms: Moré-Thuente, quadratic, unit.
 - Linear program solver: Based on the Revised Simplex method.
 - Linear program solver: Import from MPS files.
- Signal processing
 - Accurate 1D and 2D Fast Fourier Transform.
 - Complex 2D Fast Fourier Transform.
 - Unique code for factors 2, 3, 4, and 5.
 - Real and complex convolution.
 - Managed 32bit and 64bit native implementations.
- Special functions
 - Over 40 special functions are not included in the standard .NET Framework class library.
 - Functions from combinatorics: factorial, combinations, variations, and more.
 - Functions from number theory: greatest common divisor, least common multiple, decomposition into prime factors, primality testing.
 - Gamma and related functions include incomplete and regularized digamma, beta, and harmonic numbers.
 - Hyperbolic and inverse hyperbolic functions for real and complex numbers.
 - Ordinary and Modified Bessel functions of the first and second kind.
 - Airy functions and their derivatives.
 - Exponential integral, sine and cosine integral, and logarithmic integral.
- General
 - Single, double, or quad precision absolute or complex components.
 - Based on standard BLAS and LAPACK routines.
 - 100% managed implementation for security, portability, and small sizes.
 - Native, processor-optimized implementation for speed with large sizes based on the Intel® Math Kernel Library.
 - Native 64bit support.
- GPU computing
 - GPU computing: offload computations to the GPU.
 - Data is kept on the GPU as long as possible for optimal performance.
- Vectors
 - Dense vectors.
 - Band vectors.
 - Constant vectors.
 - Row, column, and diagonal vectors.
 - Vector views.
- Vector Operations
 - Basic arithmetic operations.
 - Element-wise operations.
 - They overloaded arithmetic operators.
 - Norms, dot products.
 - Most significant and smallest values.
 - Functions of vectors (sine, cosine, etc.)
- Matrices
 - General matrices.
 - Triangular matrices.
 - Real symmetric matrices and complex Hermitian matrices.
 - Band matrices.
 - Diagonal matrices.
 - Matrix views.
- Matrix Operations
 - Basic arithmetic operations.
 - Matrix-vector products.
 - They overloaded arithmetic operations.
 - Element-wise operations.
 - Row and column scaling.
 - Norms, rank, condition numbers.

- Singular values, eigenvalues, and eigenvectors.
- Matrix Decompositions
 - LU decomposition.
 - QR decomposition.
 - Cholesky decomposition.
 - Singular value decomposition.
 - Symmetric eigenvalue decomposition.
 - Non-symmetric eigenvalue decomposition.
 - Banded LU and Cholesky decomposition.
- Sparse Matrices
 - Sparse vectors.
 - Sparse matrices.
 - Matrices in Compressed Sparse Column format.
 - Sparse LU Decomposition.
 - Read matrices in Matrix Market format.
- Linear equations and least squares
 - Shared API for matrices and decompositions.
 - Determinants, inverses, numerical rank, condition numbers.
 - Solve equations with one or multiple right-hand sides.
 - Least squares solutions using QR or Singular Value Decomposition.
 - Moore-Penrose Pseudo-inverse.
 - Non-negative least squares (NNLS).
- Descriptive Statistics
 - Measures of central tendency: mean, median, trimmed mean, harmonic mean, geometric mean.
 - Measures of scale: variance, standard deviation, range, interquartile range, absolute deviation from mean and median.
 - Higher moments: skewness, kurtosis.
- Probability Distributions
 - Probability density function (PDF).
 - Cumulative distribution function (CDF).
 - Percentile or inverse cumulative distribution function.
 - Moments: mean, variance, skewness, and kurtosis.
 - Generate random samples from any distribution.
 - Parameter estimation for selected distributions.
- Continuous Probability Distributions
 - Beta distribution.
 - Cauchy distribution.
 - Chi-squared distribution.
 - Erlang distribution.
 - Exponential distribution.
 - F distribution.
 - Gamma distribution.
 - You generalized Pareto distribution.
 - Gumbel distribution.
 - Laplace distribution.
 - Logistic distribution.
 - Lognormal distribution.
 - Normal distribution.
 - Pareto distribution.
 - Piecewise distribution.
 - Rayleigh distribution.
 - Student t distribution.
 - She transformed beta distribution.
 - She transformed gamma distribution.
 - Triangular distribution.
 - Uniform distribution.
 - Weibull distribution.
- Discrete Probability Distributions
 - Bernoulli distribution.
 - Binomial distribution.
 - Geometric distribution.
 - Hypergeometric distribution.
 - Negative binomial distribution.
 - Poisson distribution.
 - Uniform distribution.
- Multivariate Probability Distributions
 - Multivariate normal distribution.
 - Dirichlet distribution.
- Histograms
 - One-dimensional histograms.
 - Probability distribution associated with a histogram.

- General Linear Models
 - Infrastructure for General Linear Model and Generalized Linear Model calculations.
 - Analysis of variance.
 - Regression analysis.
 - Model-specific hypothesis tests.
- Analysis of variance (ANOVA)
 - One and two-way ANOVA.
 - One-way ANOVA with repeated measures.
- Regression analysis
 - Simple, multiple, and polynomial regression.
 - Nonlinear regression.
 - Logistic regression.
 - You generalized linear models.
 - Flexible regression models.
 - Variance-covariance matrix, regression matrix.
 - Confidence intervals and significance tests for regression parameters.
- Time series analysis
 - Treat several observation variables as a unit.
 - Change the frequency of the time series.
 - Automatically apply predefined aggregators.
 - Advanced aggregators: volume weighted average.
- Transformations of Time Series Data
 - It lagged time series, sums, and products.
 - Change, percent change, growth rate.
 - Extrapolated change, percent change, growth rate.
 - Period-to-date sums and differences.
 - Simple, exponential, weighted moving average.
 - Savitsky-Golay smoothing.
- Multivariate Models
 - Principal Component Analysis (PCA).
 - Hierarchical clustering.
 - K-means clustering.
- Statistical tests
 - Tests for the mean: one sample z-test, one sample t-test.
 - Paired and unpaired two-sample t-test for the difference between two sample means.
 - Two Sample z-test for ratios.
 - One sample chi-squared test for variance.
 - F-test for the ratio of two variances.
 - One and two sample Kolmogorov-Smirnov test.
 - Anderson-Darling test for normality.
 - Chi-squared goodness-of-fit test.
 - Bartlett and Levene tests for homogeneity of variances.
 - McNemar and Stuart-Maxwell test.
- Random number generation
 - Compatible with the .NET Framework's System.Random.
 - Four generators with varying quality, period, and speed to suit your application.
 - Generate random samples from any distribution.
 - Fauré and Halton sequences.
 - Shufflers and randomized enumerators.

版本列表

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