IMSL Library for Java

Function Catalog

Version 2022.1.0

IMSL

Table of Contents

IMSL® LIBRARY for Java VERSION 2022.1.0

THE IMSL LIBRARY FOR JAVA IS A PURE JAVA NUMERICAL LIBRARY, PROVIDING A BROAD RANGE OF ADVANCED ALGORITHMS FOR THE JAVA ENVIRONMENT. IT ALLOWS DEVELOPERS TO SEAMLESSLY INTEGRATE ADVANCED MATHEMATICAL, STATISTICAL, AND FINANCIAL FUNCTIONS INTO THEIR JAVA APPLICATIONS.

General Features of the Library

IMSL NUMERICAL LIBRARIES

The IMSL Numerical Libraries offer an extensive and comprehensive package of trusted IMSL mathematical and statistical numerical algorithms. IMSL is available in Java™, Fortran, C, and Python.

These libraries free developers from building their own internal code by providing pre-written mathematical and statistical algorithms that can be embedded into C, Java™, Fortran, and Python applications.

CONVENIENCE AND OPEN STANDARDS

The IMSL Library for Java (or JMSL Library) is a pure Java library that operates in the Java SE and Java EE frameworks. The library allows developers to seamlessly integrate advanced mathematical, statistical, and financial functions into their Java applications.

The JMSL Library is thread safe and, like all IMSL products, is fully tested and documented, with code examples included.

The JMSL Library is designed with extensibility in mind; new classes may be derived from existing ones to add functionality to satisfy particular requirements.

ERROR HANDLING

Diagnostic error messages are clear and informative – designed not only to convey the error condition, but also to suggest corrective action if appropriate. These error-handling features:

- Allow faster and easier program debugging

- Provide more productive programming and confidence that the algorithms are functioning properly

COST-EFFECTIVE

The IMSL Library for Java significantly shortens program development time and promotes standardization. Using the JMSL Library saves time in the design, development, documentation, testing and maintenance of applications.

PREDICTIVE ANALYTICS AND DATA MINING

The JMSL Library offers a comprehensive set of functions for data mining, modeling, prediction, and optimization to support every stage of the analytic process. Predictive models and time series include ARIMA, GARCH, vector auto-regression, linear and nonlinear regression, stochastic gradient boosting, and many others. JMSL stat and data mining packages include support vector machines, neural networks, decision trees, ensemble methods like random forest, hierarchical and K++ clustering, Bayes classification, and many other methods for pattern recognition and machine learning. For optimization problems, JMSL has least squares solvers, nonlinear programming, quadratic programming, dense and sparse linear programming, and many supporting functions such as numerical derivatives.

DISTRIBUTED COMPUTING AND PARALLELISM

Distributed computing is the general term for breaking a problem down into parts and communicating the parts across a network. Parallel computing, on the other hand, refers to the simultaneous processing of parts of the larger problem.

For distributed computing, JMSL classes are easily embedded in Hadoop and Spark applications.

The JMSL Library uses Java Threads to implement parallel processing. The JMSL implementation provides methods for specifying the number of threads to be used in selected classes that may benefit most from parallel processing, such as those in the Optimization, Time Series, and Data Mining categories.

COMPREHENSIVE DOCUMENTATION

Documentation for the IMSL Library for Java is comprehensive, clearly written and standardized. Detailed information about each class consists of the name, purpose, synopsis, exceptions, return values and usage examples.

com.imsl Package

com.imsl

The com.imsl package contains basic informational and error handling classes.

ERROR HANDLING	
CLASS	**DESCRIPTION**
Messages	Retrieves and formats message strings.
IMSLFormatter	Simple formatter for classes that implement logging.
Warning	Handles warning messages.
WarningObject	Handles warning messages. This class maintains a single, private, WarningObject that actually displays the warning messages.
Version	Prints the version information.
IMSLException	An Exception class for IMSL classes.
IMSLRuntimeException	A RuntimeException class for IMSL classes.
IMSLUnexpectedErrorException	An Exception class to handle critical errors.
LicenseManagerException	A LicenseManagerException exception is thrown if a license to use the product cannot be obtained.

com.imsl.math Package

com.imsl.math

The com.imsl.math package contains a wide range of mathematical classes, beginning with basic data types such as complex numbers and matrices and progressing to advanced numerical analysis.

BASIC TYPES

CLASS	DESCRIPTION
Complex	Implements complex numbers, providing the basic operations (addition, subtraction, multiplication, division) as well as a set of complex functions.
Matrix	Matrix manipulation functions, including methods for matrix-vector, vector-matrix, matrix-matrix and vector-matrix-vector multiplications with general or symmetric matrices.
ComplexMatrix	Complex matrix manipulation functions.
SparseMatrix	Data structures and manipulation functions for sparse matrices.
ComplexSparseMatrix	Data structures and manipulation functions for complex sparse matrices.

LINEAR ALGEBRA

CLASS	DESCRIPTION
LU	Solves a real general system of linear equations $Ax = b$. Includes methods for inverse, determinant and condition number.
SuperLU	Computes the LU factorization of a general sparse matrix of type SparseMatrix by a column method and solves a real sparse linear system of equations $Ax = b$.
ComplexLU	Solves a complex general system of linear equations $Ax = b$. Includes methods for inverse, determinant and condition number.
ComplexSuperLU	Computes the LU factorization of a general sparse matrix of type ComplexSparseMatrix by a column method and solves a complex sparse linear system of linear equations $Ax = b$.
Cholesky	Solves a real symmetric positive definite system of linear equations $Ax = b$.
SparseCholesky	Computes the Cholesky factorization of a matrix of type SparseMatrix.
ComplexSparseCholesky	Computes the Cholesky factorization of a matrix of type ComplexSparseMatrix.
QR	Computes the QR decomposition of a matrix using Householder transformations.
SVD	Computes the singular value decomposition of a real rectangular matrix A.

LINEAR ALGEBRA

CLASS	DESCRIPTION
ComplexSVD	Computes the Singular Value Decomposition (SVD) of a general complex matrix.
GenMinRes	Linear system solver using the restarted generalized minimum residual (GMRES) method.
ConjugateGradient	Solves a real symmetric definite linear system using the conjugate gradient method with optional preconditioning.

EIGENSYSTEMS

CLASS	DESCRIPTION
Eigen	Computes the eigen expansion of a real matrix A.
SymEigen	Computes the eigen expansion of real symmetric matrix A.
ComplexEigen	Computes the eigenvalues and eigenvectors of a general square complex matrix.

INTERPOLATION AND APPROXIMATION

CLASS	DESCRIPTION
Spline	A collection of spline functions. Includes methods to evaluate, integrate and compute derivatives of splines.
CsAkima	Extension of the Spline class to compute an Akima cubic spline interpolant.
CsTCB	Extension of the Spline class to handle a tension-continuity-bias (TCB) cubic spline, also known as a Kochanek-Bartels spline and is a generalization of the Catmull-Rom spline.
CsInterpolate	Extension of the Spline class to compute a cubic spline interpolant with specified derivative endpoint conditions.
CsPerodic	Extension of the Spline class to compute a cubic spline interpolant with periodic boundary conditions.
CsShape	Extension of the Spline class to compute a cubic spline interpolant consistent with the concavity of the data.
CsSmooth	Extension of the Spline class to construct a smooth cubic spline to noisy data.
CsSmoothC2	Extension of the Spline class to construct a smooth cubic spline to noisy data using cross-validation to estimate the smoothing parameter.
BSpline	A collection of B-Spline functions, including methods to evaluate, integrate, and compute derivatives of B-Splines, plus conversion of B-Splines to piecewise polynomials for charting.
BsInterpolate	Extension of the BSpline class to interpolate data points.
BsLeastSquares	Extension of the BSpline class to compute a least squares B-spline approximation to data points.
Spline2D	Represents and evaluates tensor-product splines.

INTERPOLATION AND APPROXIMATION

CLASS	DESCRIPTION
Spline2DLeastSquares	Computes a two-dimensional, tensor-product spline approximant using least squares.
Spline2DInterpolate	Computes a two-dimensional, tensor-product spline interpolant from two-dimensional, tensor-product data.
RadialBasis	Computes a least-squares fit to scattered data over multiple dimensions.

QUADRATURE

CLASS	DESCRIPTION
Quadrature	A general-purpose integrator that uses a globally adaptive scheme to reduce the absolute error.
HyperRectangleQuadrature	Integrates a function on a hyper-rectangle using a quasi-Monte-Carlo method.

DIFFERENTIAL EQUATIONS

CLASS	DESCRIPTION
ODE	ODE represents and solves an initial-value problem for ordinary differential equations.
OdeRungeKutta	Solves an initial-value problem for ordinary differential equations using the Runge-Kutta-Verner fifth-order and sixth-order methods.
OdeAdamsGear	Extension of the ODE class to solve a stiff initial-value problem for ordinary differential equations using the Adams-Gear methods.
FeynmanKac	Solves the generalized Feynman-Kac PDE.

TRANSFORMS

CLASS	DESCRIPTION
FFT	Discrete Fourier transform of a real sequence.
ComplexFFT	Discrete Fourier transform of a complex sequence.

NONLINEAR EQUATIONS

CLASS	DESCRIPTION
ZeroPolynomial	Finds the zeros of a polynomial with complex coefficients using Aberth's method.
ZerosFunction	Finds the real zeros of a real, continuous, univariate function, $f(x)$.
ZeroSystem	Solves a system of n nonlinear equations $f(x) = 0$ using a modified Powell hybrid algorithm.

OPTIMIZATION

CLASS	DESCRIPTION
MinUncon	Finds the minimum point of a smooth function $f(x)$ of a single variable.
MinUnconMultiVar	Minimizes a function $f(x)$ of n variables using a quasi-Newton method.
NonlinLeastSquares	Solves a nonlinear least-squares problem using a modified Levenberg-Marquardt algorithm.
SparseLP	Solves a sparse linear programming problem by an infeasible primal-dual interior-point method.
DenseLP	Solves a linear programming problem using an active set strategy.
QuadraticProgramming	Solves a quadratic programming problem subject to linear equality or inequality constraints.
MinConGenLin	Minimizes a general objective function subject to linear equality/inequality constraints.
BoundedLeastSquares	Solves a nonlinear least-squares problem subject to bounds on the variables using a modified Levenberg-Marquardt algorithm.
BoundedVariableLeastSquares	Solves a linear least-squares problem with bounds on the variables.
NonNegativeLeastSquares	Solves a linear least squares problem with non-negative constraints.
MinConNLP	Solves a general nonlinear programming problem using a sequential equality constrained quadratic programming method.
NumericalDerivatives	Computes the Jacobian matrix for a function $f(y)$ with m components in n independent variables.
NelderMead	Solves unconstrained and box-constrained optimization problems using a direct search polytope method.
Transport	Solves the transportation problem from linear optimization using the revised simplex method or the interior point method of class SparseLP.

SPECIAL FUNCTIONS

CLASS	DESCRIPTION
Sfun	Collection of special functions including beta, gamma and others.
Bessel	Collection of Bessel functions.
JMath	Pure Java implementation of the standard java.lang.Math class.
IEEE	Pure Java implementation of the IEEE 754 functions as specified in IEEE Standard for Binary Floating-Point Arithmetic, ANSI/IEEE Standard 754-1985 (IEEE, New York).
Hyperbolic	Pure Java implementation of the hyperbolic functions and their inverses.

MISCELLANEOUS

CLASS	DESCRIPTION
Physical	Returns the value of various mathematical and physical constants.
EpsilonAlgorithm	Determines the limit of a sequence of approximations by means of the Epsilon algorithm.

PRINTING

CLASS	DESCRIPTION
PrintMatrix	Matrix printing utilities.
PrintMatrixFormat	Customizes the actions of PrintMatrix.

com.imsl.stat Package

com.imsl.stat

The package com.imsl.stat contains a wide range of statistical classes, including summary statistics, regression, ANOVA.

BASIC STATISTICS

CLASS	DESCRIPTION
Summary	Computes basic univariate statistics.
NormOneSample	Computes statistics for mean and variance inferences using a sample from a normal population.
NormTwoSample	Computes statistics for mean and variance inferences using samples from two normal populations.
Sort	Sorts observations by specified keys.
Ranks	Computes the ranks, normal scores, or exponential scores for a vector of observations.
EmpiricalQuantiles	Determines empirical quantiles.
TableOneWay	Tallies observations into a one-way frequency table.
TableTwoWay	Tallies observations into a two-way frequency table.
TableMultiWay	Tallies observations into a multi-way frequency table.
WelchsTTest	Performs Welch's approximate t-test for two independent normal populations with unequal variances.

VARIANCES, COVARIANCES, AND CORRELATIONS

CLASS	DESCRIPTION
Covariances	Computes the sample variance-covariance or correlation matrix.
PartialCovariances	Computes the partial covariances or partial correlations from an input covariance or correlation matrix.
PooledCovariances	Computes the pooled variance-covariance matrix from one or more sets of observations.

REGRESSION

CLASS	DESCRIPTION
RegressorsForGLM	Generates regressors for a general linear model from a data matrix.
LinearRegression	Computes a new linear regression object using least squares.
NonlinearRegression	Fits a multivariate nonlinear regression model using least squares.
UserBasisRegression	Generates summary statistics using user supplied functions in a nonlinear regression model.
RegressionBasis	Interface for user defined regression basis functions.
SelectionRegression	Selects the best multiple linear regression models.
StepwiseRegression	Builds multiple linear regression models using forward selection, backward selection, or stepwise selection.

ANALYSIS OF VARIANCE

CLASS	DESCRIPTION
ANOVA	Provides an Analysis of Variance table and related statistics.
ANOVAFactorial	Analyzes a balanced factorial design with fixed effects.
ANCOVA	Analyzes a one-way factorial classification model with covariates.
MultipleComparisons	Performs Student-Newman-Keuls multiple comparisons test.

CATEGORICAL AND DISCRETE DATA ANALYSIS

CLASS	DESCRIPTION
ContingencyTable	Provides an Analysis of Variance table and related statistics.
CategoricalGenLinModel	Analyzes categorical data using logistic, probit, Poisson, and other generalized linear models.

NONPARAMETRIC STATISTICS

CLASS	DESCRIPTION
SignTest	Performs a sign test.
WilcoxonRankSum	Performs a Wilcoxon rank sum test.

GOODNESS OF FIT

CLASS	DESCRIPTION
ChiSquaredTest	Chi-squared goodness-of-fit test.
NormalityTest	Performs a test for normality.
KolmogorovOneSample	Performs a Kolmogorov-Smirnov goodness-of-fit test in one sample.
KolmogorovTwoSample	Computes Kolmogorov-Smirnov two-sample test statistics for testing that two continuous cumulative distribution functions (CDF's) are identical based upon two random samples.

TIME SERIES AND FORECASTING

CLASS	DESCRIPTION
AutoCorrelation	Computes the sample autocorrelation function of a stationary time series.
ARAutoUnivariate	Automatically determines the best autoregressive time series model using Akaike's Information Criterion.
ARSeasonalFit	Estimates the optimum seasonality parameters for a time series using an autoregressive model, $AR(p)$, to represent the time series.
ARMA	Computes least-square estimates of parameters for an ARMA model. Also computes forecasts and their associated probability limits for an ARMA model.
ARMAEstimateMissing	Estimates missing values in a time series collected with equal spacing. Missing values can be replaced by these estimates prior to fitting a time series using the ARMA class.
ARMAMaxLikelihood	Computes maximum likelihood estimates of parameters for an ARMA model with p and q autoregressive and moving average terms respectively.
ARMAOutlierIdentification	Detects and determines outliers and simultaneously estimates the model parameters in a time series whose underlying outlier free series follows a general seasonal or nonseasonal ARMA model.
AutoARIMA	Automatically identifies time series outliers, determines parameters of a multiplicative seasonal model and produces forecasts that incorporate the effects of outliers whose effects persist beyond the end of the series.
CrossCorrelation	Computes the sample cross-correlation function of two stationary time series.
Difference	Differences a seasonal or nonseasonal time series.
EGARCH	Computes estimates of the parameters of the Exponential GARCH model. Extends the abstract class, ExtendedGARCH.
ExtendedGARCH	An abstract class with some common methods for extended GARCH models.
GARCH	Computes estimates of the parameters of a GARCH(p, q) model.
KalmanFilter	Performs Kalman filtering and evaluates the likelihood function for the state-space model.
MultiCrossCorrelation	Computes the multichannel cross-correlation function of two mutually stationary multichannel time series.
LackOfFit	Performs lack-of-fit test for a univariate time series or transfer function given the appropriate correlation function.

TIME SERIES AND FORECASTING

CLASS	DESCRIPTION
HoltWintersExponentialSmoothing	Calculates parameters and forecasts using the Holt-Winters Multiplicative or Additive forecasting method for seasonal data.
TimeSeries	A specialized class for time series data and analysis.
TimeSeriesOperations	Implements special methods for TimeSeries objects.
VectorAutoregression	Provides methods for vector autoregression (VAR).

MULTIVARIATE ANALYSIS

CLASS	DESCRIPTION
ClusterKMeans	Performs a *K*-means (centroid) cluster analysis.
ClusterKNN	Performs a k-Nearest Neighbor classification.
Dissimilarities	Computes a matrix of dissimilarities (or similarities) between the columns (or rows) of a matrix.
ClusterHierarchical	Performs a hierarchical cluster analysis given a distance matrix.
FactorAnalysis	Performs Principal Component Analysis or Factor Analysis on a covariance or correlation matrix.
DiscriminantAnalysis	Performs a linear or a quadratic discriminant function analysis among several known groups.
Multidimensional Scaling	Performs multidimensional scaling.

SURVIVAL AND RELIABILTY ANALYSIS

CLASS	DESCRIPTION
KaplanMeierECDF	Computes the Kaplan-Meier reliability function estimates or the CDF based on failure data that may be multi-censored.
KaplanMeierEstimates	Computes Kaplan-Meier (or product-limit) estimates of survival probabilities for a sample of failure times that possibly contain right censoring.
ProportionalHazards	Analyzes survival and reliability data using Cox's proportional hazards model.
LifeTables	Computes population (current) or cohort life tables based upon the observed population sizes at the middle (for population table) or the beginning (for cohort table) of some user specified age intervals.

PROBABILITY DISTRIBUTION FUNCTIONS AND INVERSES

CLASS	DESCRIPTION
CDF	Cumulative distribution functions.

PROBABILITY DISTRIBUTION FUNCTIONS AND INVERSES

CLASS	DESCRIPTION
PDF	Probability density functions.
InvCdf	Inverse cumulative probability distribution functions.
CdfFunction	Interface for user defined cumulative distribution function.
InverseCdf	Evaluates the inverse of a continuous, strictly monotone function.
Distribution	Interface for user defined distribution function.
ProbabilityDistribution	Interface for user defined probability distribution.
NormalDistribution	Evaluates a normal (Gaussian) probability distribution.
GammaDistribution	Evaluates a gamma probability distribution.
LogNormalDistribution	Evaluates a lognormal probability distribution.
PoissonDistribution	Evaluates a Poisson probability distribution.
GeneralizedGaussian	Evaluates a generalized Gaussian distribution.
GeneralizedExtremeValue	Evaluates a generalized extreme value distribution.
GeometricPareto	Evaluates a generalized Pareto distribution.

RANDOM NUMBER GENERATION

CLASS	DESCRIPTION
Random	Random number generators with support for several distributions.
FaureSequence	Generates the low-discrepancy shuffled Faure sequence. This is also called a quasi-random generator.
MersenneTwister	Generates uniform pseudorandom 32-bit numbers with a period of $2^{19937}-9937$rs with a period of 2dom 32-bited Faure seque.
MersenneTwister64	Generates uniform pseudorandom 64-bit numbers with a period of $2^{19937}-1$ and a 623-dimensional equidistribution property.
RandomSamples	Generates a simple pseudorandom sample from a finite population, a sample of indices, or a permutation of an array of indices.
RandomSequence	Interface implemented by generators of random or quasi-random multidimensional sequences.

com.imsl.datamining Package

com.imsl.datamining

The package com.imsl.datamining contains data mining classes including Naïve Bayes classifier, Apriori, and Kohonen Self Organizing Map

Datamining	
CLASS	DESCRIPTION
NaiveBayesClassifier	Trains a Naïve Bayes Classifier.
Itemsets	Sets of items discovered by the Apriori algorithm.
AssociationRule	Association rules generated by the Apriori algorithm.
Apriori	Perform the Apriori algorithm for association rule discovery.
KohonenSOM	A Kohonen selforganizing map.
KohonenSOMTrainer	Trains a Kohonen network.
PredictiveModel	Defines the members and methods common to predictive models in univariate prediction or classification problems.
CrossValidation	Performs V-Fold cross-validation for predictive models.
BootstrapAggregation	Performs bootstrap aggregation to generate predictions using predictive models.
GradientBoosting	Performs stochastic gradient boosting for a single response variable and multiple predictor variables.
ContinuousAttribute	Creates a continuous attribute type to be used for training a classifier.
GradientBoostingModelObject	Extracts the parameters from a gradient boosting model for the purpose of predicting new data sets.
LogisticsRegression	Performs binomial or multinomial logistic regression.
LogisticsRegressionModelObject	Extracts the parameters of a logistic regression model for the purpose of predicting new data sets.

com.imsl.datamining.decisionTree Package

com.imsl.datamining.decisionTree

The package com.imsl.datamining.decisionTree contains decision tree data mining classes for CART™, C4.5, CHAID, and QUEST methods.

Decision Trees	
CLASS	**DESCRIPTION**
TreeNode	A DecisionTree node which may be used as a child node of Tree.
Tree	Root node of a decision tree containing information about the relationship of child nodes.
DecisionTree	Generates a decision tree for a single response variable and two or more predictor variables.
DecisionTreeInfoGain	Extends DecisionTree for methods which use information gain criteria.
ALACART	Generates a decision tree using the CART™ method.
C45	Generates a decision tree using the C4.5 algorithm.
CHAID	Generates a decision tree using CHAID for categorical or discrete ordered predictor variables.
QUEST	Generates a decision tree using the QUEST algorithm.
RandomTrees	Performs the random forest ensemble method for decision trees.

com.imsl.datamining.neural Package

com.imsl.datamining.neural

The com.imsl.datamining.neural package contains feed forward multilayer neural network training and forecasting engines plus algorithms to facilitate data pre- and post-processing.

NEURAL NETS	
CLASS	**DESCRIPTION**
Network	A neural network.
FeedForwardNetwork	A feed forward neural network.
Layer	The base class for the input, hidden, and output layers in a neural network.
InputLayer	The input layer in a neural network.
HiddenLayer	The hidden layer in a neural network.
OutputLayer	The output layer in a neural network.
Node	A node with an input node or perceptron in a neural network.
InputNode	A node in the input layer.
Perceptron	A perceptron node in a neural network.
OutputPerceptron	A perceptron in the output layer.
Activation	Interface implemented by perceptron activation functions.
Link	A link in the neural network between two network nodes.
Trainer	Interface implemented by classes used to train a network.
QuasiNewtonTrainer	Trains a feed forward network using quasi-Newton optimization.
LeastSquaresTrainer	Trains a feed forward network using the Levenberg-Marquardt nonlinear least squares algorithm.
EpochTrainer	A two-stage trainer. Stage I trains using epochs of randomly selected training patterns. Stage II uses all training patterns and is optional.
BinaryClassification	Classifies patterns into two categories.
MultiClassification	Classifies patterns into multiple categories.
ScaleFilter	Scales or unscales continuous data prior to its use in neural network training, testing, or forecasting.

NEURAL NETS

CLASS	DESCRIPTION
UnsupervisedNominalFilter	Encodes nominal data into a series of binary columns for input into a neural network. It also decodes binary columns in a single column of nominal values.
UnsupervisedOrdinalFilter	Encodes ordinal data into cumulative percentages. It also decodes cumulative percentages into an ordinal variable.
TimeSeriesFilter	Converts time series data to a format used for neural network training by lagging an input series into several columns, one for each lag requested.
TimeSeriesClassFilter	Converts categorized time series data to a format used for neural network training. An input series is lagged into several columns, one for each lag requested. Lagging is calculated within each class of a nominal variable.

com.imsl.datamining.supportvectormachine Package

com.imsl.datamining.supportvectormachine

The com.imsl.datamining.supportvectormachine package contains classes featuring machine learning algorithms for classification, regression, and the so-called one class problem. Each formulation uses a kernel based optimization to find support vectors that optimally separate clouds of high dimensional data for the purpose of making predictions. The classes are based on the LIBSVM package for support vector machines.

SUPPORT VECTOR MACHINES	
CLASS	**DESCRIPTION**
DataNode	Specifies a data node for a support vector machine.
Kernel	Abstract class to specify a kernel function for support vector machines.
LinearKernel	Specifies the linear kernel for support vector machines.
PolynomialKernel	Specifies the polynomial kernel for support vector machines.
RadialBasisKernel	Specifies the radial basis kernel for support vector machines.
SigmoidKernel	Specifies the sigmoid kernel for support vector machines.
SupportVectorMachine	Abstract class for generating a support vector machine.
SVClassification	Specifies a support vector machine for classification (SVC).
SVModel	Contains model estimates after training a support vector machine.
SVOneClass	Specifies a support vector machine for the one class problem.
SVRegression	Specifies a support vector machine for regression (SVR).

com.imsl.stat.distributions Package

com.imsl.stat.distributions

The com.imsl.stat.distributions package supports modeling and estimating univariate probability distributions.

Distributions	
CLASS	**DESCRIPTION**
MaximumLikelihoodEstimation	Maximum likelihood parameter estimation.
ProbabilityDistribution	Defines members and methods common to univariate probability distributions and useful in parameter estimation.
PDFGradientInterface	Interface for probability distributions which supply a method to calculate the gradient of the density function.
PDFHessianInterface	Interface for probability distributions which supply methods to calculate the gradient and hessian of the density function.
ClosedFormMaximumLikelihoodInterface	Interface for probability distributions that provide a method for a closed form solution of the maximum likelihood function.
BetaPD	The beta probability distribution.
ContinuousUniformPD	The continuous uniform probability distribution.
ExponentialPD	The exponential probability distribution.
ExtremeValuePD	The extreme value distribution.
GammaPD	The gamma probability distribution.
GeneralizedGaussianPD	The generalized Gaussian distribution.
GeometricPD	The geometric distribution.
LogisticPD	The logistic distribution.
LogNormalPD	The log-normal distribution.
NormalPD	The normal probability distribution.
PoissonPD	The Poisson distribution.
RayleighPD	The Rayleigh distribution.
WeibullPD	The Weibull distribution.

com.imsl.finance Package

com.imsl.finance

The com.imsl.finance package contains a set of classes covering a variety of investment calculations including an extensive collection of bond functions.

Finance	
CLASS	**DESCRIPTION**
BasisPart	Interface for day count basis.
Bond	Collection of bond functions including interest, and price and yield methods.
DayCountBasis	Rules for computing the number or days between two dates or number of days in a year. For many securities, computations are based on rules other than on the actual calendar.
Finance	Collection of finance functions including depreciations, present values, and internal rate of return methods.

com.imsl.io Package

com.imsl.io

The com.imsl.io package is designed to allow input/output operations.

Input/Output	
CLASS	**DESCRIPTION**
AbstractFlatFile	Reads a text or a binary file as a ResultSet.
FlatFile	Reads a text file as a ResultSet.
Tokenizer	Breaks a line into tokens.
MPSReader	Reads a linear programming problem from an MPS file.

IMSL by Perforce

AT PERFORCE, YOUR SUCCESS IS OUR PRIDE. IT'S TRUE WHETHER YOU'RE AN
ENTERPRISE ORGANIZATION TRYING TO DEVELOP BETTER PRODUCTS FASTER, OR
YOU'RE AN EMPLOYEE TRYING TO DEVELOP A BETTER CAREER. WE BELIEVE IN
THE POWER OF TEAMWORK. AND THAT OUR DEVELOPMENT TOOLS SHOULD
EMPOWER THE DIVERSE TEAMS THAT USE THEM BY ENHANCING COLLABORATION,
CONTROL, QUALITY, SPEED, SCALE, AND FREEDOM.