TOMLAB® - For fast and robust large-scale optimization in MATLAB®

The TOMLAB Optimization Environment is a powerful optimization and modeling package for solving applied optimization problems in MATLAB. TOMLAB provides a wide range of features, tools and services for your solution process:

- A uniform approach to solving optimization problem.

- A modeling class, tomSym, for lightning fast source transformation.

- Automatic gateway routines for format mapping to different solver types.

- Over 100 different algorithms for linear, discrete, global and nonlinear optimization.

- A large number of fully integrated Fortran and C solvers.

- Full integration with the MAD toolbox for automatic differentiation.

- 6 different methods for numerical differentiation.

- Unique features, like costly global black-box optimization and semi-definite programming with bilinear inequalities.

- Demo licenses with no solver limitations.

- Call compatibility with MathWorks' Optimization Toolbox.

- Very extensive example problem sets, more than 700 models.

- Advanced support by our team of developers in Sweden and the USA.

- TOMLAB is available for all MATLAB R2007b+ users.

- Continuous solver upgrades and customized implementations.

- Embedded solvers and stand-alone applications.

- Easy installation for all supported platforms, Windows (32/64-bit) and Linux/OS X 64-bit

For more information, see http://tomopt.com or e-mail tomlab@tomopt.com.

Modeling Environment: http://tomsym.com.

Dedicated Optimal Control Page: http://tomdyn.com.

The TOMLAB Product Family

TOMLAB /BASE v8.0 - Now with a symbolic modeling engine!
The TOMLAB Base Module includes 32 solvers for a wide variety of problem types, routines for problem setup and analysis, sparse and dense solvers for global optimization, linear/nonlinear least squares and nonlinear programming are also included.

Most popular features include:

- ✓ **Tlsqr:** Large-scale sparse linear least squares.
- ✓ **glcCluster:** Mixed-integer nonlinear global optimization.
- ✓ **glcDirect:** Modified C implementation of the DIRECT method.
- ✓ **PDCO:** Primal-dual barrier method for convex objectives, handles linear constraints.
- ✓ **slsSolve:** Sparse least squares with nonlinear constraints.

Linear, Mixed-Integer, Quadratic, Mixed-Integer Quadratic Programming. Mixed-Integer Quadratic with Quadratic Constraints.

TOMLAB /GUROBI v5.6
GUROBI Optimizations' groundbreaking suite for parallel mixed-integer programming.

TOMLAB /CPLEX v12.5
ILOG's state-of-the-art CPLEX simplex and barrier LP, QP, MIP, MIPQ and MIQQ solvers. Supports logical constraints. The TOMLAB package gives the MATLAB user full control of this powerful suite. Parallell processing on up to 64 processors is possible.

Nonlinear Programming

TOMLAB /CONOPT v3.1
Large-scale nonlinear solver with a feasible path GRG method. Developed in cooperation with Arki Consulting and Development A/S.

TOMLAB /MINOS v8.0
Solvers from Stanford Systems Optimization Laboratory and UC San Diego for large-scale sparse nonlinear programming (MINOS), and dense LP and QP (LPOPT, QPOPT).

TOMLAB /SNOPT v8.0
Solvers from Stanford Systems Optimization Laboratory and UC San Diego for large-scale sparse nonlinear programming (SNOPT, MINOS), and sparse or dense LP and QP (LPOPT, QPOPT, SQOPT).

TOMLAB /NPSOL v8.0
Solvers from Stanford Systems Optimization Laboratory and UC San Diego for large-scale sparse nonlinear programming (NPSOL®, MINOS) dense LP and QP (LPOPT, QPOPT), and linear and nonlinear least squares (LSSOL, NLSSOL) problems.

Global Optimization

TOMLAB /CGO v8.0
Toolbox for costly optimization. The solvers handle mixed-integer global nonconvex problems with CPU-intensive objective functions and constraints.

TOMLAB /LGO
Integrated solver suite for general constrained (global and local) optimization. LGO solver options include branch-and-bound, adaptive stochastic global search, stochastic multistart based global search, and reduced gradient local search modules. LGO is developed and maintained by Pintér Consulting Service, Inc.

TOMLAB /GENO
Toolbox for genetic and evolutionary optimization. The solver handles uni- and multi-objective optimization problems.

Mixed-Integer Nonlinear Programming

TOMLAB /MINLP v1.5

Sparse and dense versions of solvers BQPD for QP, Filter SQP for nonlinear programming, MIQP[bb] for MIQP and MINLP[bb] for mixed-integer nonlinear programming. Developed by Fletcher and Leyffer, University of Dundee, Scotland.

TOMLAB /OQNLP

Multistart heuristic algorithm to find global optima of smooth constrained nonlinear programs and mixed-integer nonlinear programs, in cooperation with Optimal Methods, Inc.

TOMLAB /KNITRO v9.0

Industy-standard sparse nonlinear interior point solver efficiently integrated in TOMLAB. KNITRO implements a novel algorithm for nonlinear programming. The algorithm belongs to the class of interior or barrier methods, and uses trust regions to promote convergence. And active-set solver is also included. All solver algorithms can be used to solve MPEC problems. The latest version also support MINLP problem with two alternative methods.

Semidefinite Programming

TOMLAB /PENSDP v2.0 /PENBMI v2.0

Solver from PENOPT GbR for semidefinite programming. The solvers handle linear objectives with linear matrix inequality constraints (LMI). PENBMI also handles bilinear matrix inequalities (BMI).

Multi-Objective Optimization

TOMLAB /NLPQL v2.7

Klaus Schittkowski's package for multi criteria optimization and nonlinear fitting problems. The package includes a dense SQP solver (NLPQLP), an interface suite for multi criteria optimization (NLPJOB) and a solver for nonlinear data fitting problems (DFNLP).

Optimal Control

TOMLAB /PROPT

TOMLAB-integrated platform for optimal control. The system uses the symbolic modeling engine tomSym and automatically generates m-file code, two levels of derivatives, sparsity patterns and more to achieve superior performance. See this link for more information: http://tomdyn.com.

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Geometric Programming

TOMLAB /GP
A powerful package for geometric programming. Specialized tools are needed for these problem types as the optimum is commonly non-differentiable. The solver uses an efficient interior-point algorithm in the solution process.

Automatic Differentiation

TOMLAB /MAD
A powerful package for automatic differentiation in MATLAB. The system includes a full TOMLAB integration and a stand-alone version of MAD. The system is maintained in cooperation with Cranfield University.

Other products

TOMLAB /AMPL v2.0
Problems formulated in AMPL can be solved in TOMLAB. The interface detects problem type, and assign the problem to the appropriate TOMLAB structure. The pre-defined problem types are: LP, MILP, QP, MIQP, NLP and MINLP.