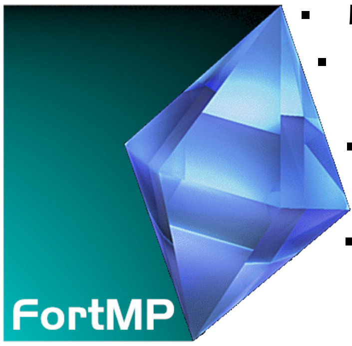
FortMP Optimization System

FortMP is a state of the art optimization system designed to solve a wide range of well known optimization problems including:



- Large Scale Linear Programming problems
- Mixed integer programming problems with zero-one as well as general integer variables
- Convex quadratic programming problems
- Mixed integer quadratic programming problems
- Variable Separable Programming problems including special ordered sets of type 1 and type 2 (SOS1 and SOS2)

FortMP has been widely deployed to solve many management science and operational research problems. An illustrative (though not exhaustive) list of applications include Transportation, Scheduling, Chemical Engineering Product Blending, Economic Modeling, Energy Systems and Networks, Industrial Scheduling Applications involving Linear or Discrete Optimization, Financial modeling encompassing asset liability management and Markowitz's MV Model, with threshold and cardinality restrictions.

Computational Algorithms

FortMP incorporates a suite of well known solution algorithms that have been carefully designed taking into consideration underlying data structures and modular processing components such that different features can interact well with each other. Research and development of the underlying algorithms started in the mid eighties. The computational algorithms and the software system have been constantly updated in line with the developments, which continue to take place in the field.

Linear programming problems are processed by sparse simplex (SSX) with both PRIMAL and DUAL variants. An interior point method (IPM) algorithm is also included which uses the PRIMAL-DUAL Logarithmic barrier method with predictor-corrector extensions. A powerful basis recovery (cross over) algorithm combines the speed of the IPM solution with the warm restart property of the SSX.

Mixed integer programs are solved by applying a branch and bound (tree search) method. By incorporating up to date cutting plane methods and integer preprocessing techniques the MIP solver engine is kept highly competitive and effective in solving discrete optimization problems. The mixed integer programming feature can run under a single or multiple distributed memory parallel processors. The performance can be tuned for both these platforms.

Although recently introduced the convex quadratic programming (QP) and the quadratic mixed integer programming (QMIP) features have already been deployed to solve a wide range of financial modeling problems. QPs are solved using either the SSX or the IPM algorithm, the QMIP has already set an industry standard and leads the pack of other solvers.

Connected

The solver is connected to two of the optimization industry's leading modeling systems MPL and AMPL.

Supporting Documents

Please contact us to obtain a copy of our benchmarks document, or a list or publications related to FortMP.

Embeddable

FortMP is also available as a callable library that makes it easy to carry out optimization based application development with an embedded solver. The library is callable both from C and Fortran 90 user programs.

Contact:

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OptiRisk SYSTEMS

Advantages

- Modular Design, fine tuned for Serial or Parallel platforms
- Can be embedded within other software environments
- Available in object form as a callable library. Source code can be made available
- A range of applications can be constructed by calling various sub-routines from a main C or Fortran program
- Connectivity with Algebraic Modeling Languages such as MPL and AMPL
- Local or Client/Server Environment

Platforms

- DOS, Win95/NT
- Most variants of UNIX and Linux

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FortMP Versions and Features

Versions (model size processed)	Algorithm Features							
	LP / SSX	LP / IPM	Crossover	MIP / B & B	MIP / Parallel	QP / SSX	QP / IPM	QMIP
rows: 1,000 columns: 2,000				✓				
rows: 5,000 columns: 10,000				✓				
Unlimited	✓	✓	✓	✓	✓	✓	✓	✓

Keys:

LP: Linear Programming
IPM: Interior Point Method
MIP: Mixed Integer Programming
QP: Quadratic Programming
SSX: Sparse Simplex
QMIP: Quadratic Mixed Integer Programming
B & B: Branch and Bound