

GAMS

# Modeling for the Real World

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## High-Level Modeling

The General Algebraic Modeling System (GAMS) is a high-level modeling system for mathematical programming problems. GAMS is tailored for complex, large-scale modeling applications, and allows you to build large maintainable models that can be adapted quickly to new situations. Models are fully portable from one computer platform to another.

## A Wide Range of Model Types

GAMS allows the formulation of models in many different problem classes, including

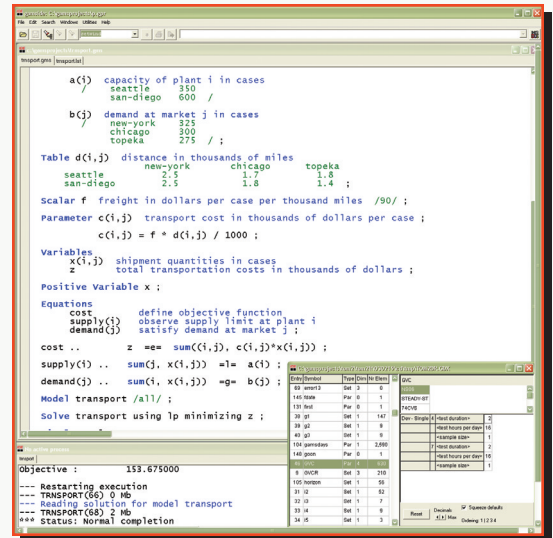
- Linear (LP) and Mixed Integer Linear (MIP)
- Quadratic Programming (QCP) and Mixed Integer QCP (MIQCP)
- Nonlinear (NLP) and Mixed Integer NLP (MINLP)
- Constrained Nonlinear Systems (CNS)
- Mixed Complementary (MCP)
- Programs with Equilibrium Constraints (MPEC)
- Conic Programming Problems
- Stochastic Linear Problems

	Solver/Model type availability											
	LP	MIP	NLP	MCP	MPEC	CNS	DNLP	MINLP	QCP	MIQCP	Stoch.	Global Cone
BARON												
BDMLP	✓	✓										
CONOPT	✓	✓	✓			✓	✓		✓			
CONVERT	✓	✓	✓	✓	✓		✓		✓			
CPLEX	✓	✓							✓			
DECIS	✓											✓
DICOPT	✓	✓							✓			
LGO	✓		✓						✓			✓
MILES	✓		✓						✓			
MINOS	✓								✓			
MOSEK	✓	✓							✓			
MSNLP	✓	✓							✓			✓
NLPEC	✓			✓					✓			
OQNLP	✓								✓			✓
OSL	✓	✓										
OSLSE	✓		✓									✓
PATH	✓			✓								
PATHNLP	✓		✓						✓			
SBB	✓								✓			
SNOPT	✓								✓			
XA	✓	✓							✓			
XPRESS	✓	✓							✓			

GAMS Model Types by Solvers.

## Versatile Utilities

In addition to our large portfolio of solvers, we offer a range of utilities useful for modeling, data manipulation, and interfacing with other applications. These include utilities for interfacing with applications such as databases, visualization software, as well as tools for converting GAMS models into other formats (CONVERT) and Windows UNIX-like manipulation utilities (grep, awk, sed, etc.).



GAMS Integrated Developer Environment for editing, debugging, solving models, and viewing data.

## State-of-the-Art Solvers

GAMS incorporates all major commercial and academic state-of-the-art solution technologies for a broad range of problem types, including a range of global solvers for nonlinear models.

BARON	Branch-and-Reduce Optimization Navigator for proven global solutions from The Optimization Firm
BDMLP	LP solver that comes with any GAMS system
COIN	Link to the solvers in the COIN-OR project (Computational Infrastructure - Operations Research)
CONOPT	Large scale NLP solver from ARKI Consulting and Development
CONVERT	Frame work for translating models into scalar models of other languages
CPLEX	High-performance LP/MIP solver from Ilog
DECIS	Large scale stochastic programming solver from Stanford University
DICOPT	Framework for solving MINLP models. From Carnegie Mellon University
EXAMINER	A tool for examining solution points and assessing their merit
GAMSBAS	A Program for Saving an Advanced Basis for GAMS
GAMSCHEK	A System for Examining the Structure and Solution Properties of Linear Programming Problems Solved using GAMS
LGO	Lipschitz global optimizer from Pinter Consulting Services
MILES	MCP solver from University of Colorado at Boulder that comes with any GAMS system
MINOS	NLP solver from Stanford University
MOSEK	Large scale LP/MIP plus conic and convex non-linear programming system from EKA Consulting
MPSGE	Modeling Environment for CGE models from University of Colorado at Boulder
MPSWRITE	MPS file generator that comes with any GAMS System
MSNLP	Multi-start method for global optimization from Optimal Methods Inc.
NLPEC	MPEC to NLP translator that uses other GAMS NLP solvers
OQNLP	Multi-start method for global optimization from Optimal Methods Inc.
OSL	High performance LP/MIP solver from IBM
OSLSE	OSL Stochastic Extensions for solving stochastic models
PATH	Large scale MCP solver from University of Wisconsin at Madison
PATHNLP	Large scale NLP solver for convex problems from University of Wisconsin at Madison
SBB	Branch-and-Bound algorithm from ARKI for solving MINLP models
SCENRED	A tool for the reduction of scenarios modeling the random data processes
SNOPT	Large scale SQP based NLP solver from Stanford University
XA	Large scale LP/MIP system from Sunset Software
XPRESS	High performance LP/MIP solver from Dash

GAMS Portfolio of Solvers