

# Modeling for the Real World

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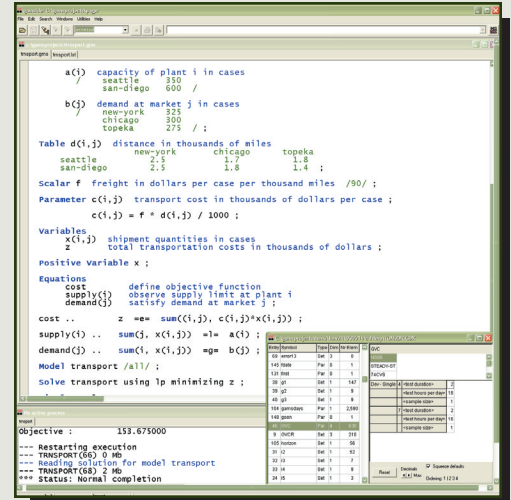
## High-Level Modeling

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.

## Multiple Model Types

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

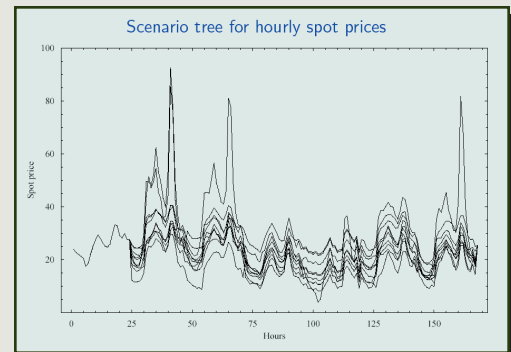
- Linear (LP) and Mixed Integer Linear (MIP)
- Nonlinear (NLP) and Mixed Integer Nonlinear (MINLP)
- Mixed Complementary (MCP)
- Programs with Equilibrium Constraints (MPEC)
- Stochastic Linear Programming (SP)



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 and linear stochastic programming solvers.

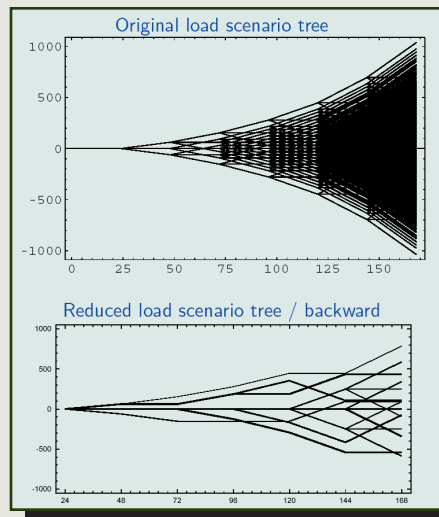


Electrical load management using stochastic programming: scenario tree showing spot prices by the hour.

## Stochastic Applications

Stochastic programming techniques have been successfully applied to a wide variety of application areas, including problems in:

- Finance
- Logistics, Distribution, and Transportation
- Risk Management
- Energy
- Yield/Revenue Management



Scenario reduction for SP using GAMS/SCENRED.

## Stochastic Programming

Optimization under uncertainty is of growing importance in many practical fields. Stochastic programming problems can be solved by incorporating probability distributions governing the data. Solvers for linear stochastic programming within GAMS use various effective approaches and include:

- DECIS (importance sampling)
- IBM Stochastic Extensions (multi-stage Benders decomposition)
- SCENRED (multi-stage scenario reduction)

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