

# ➤ OPTIMIZATION

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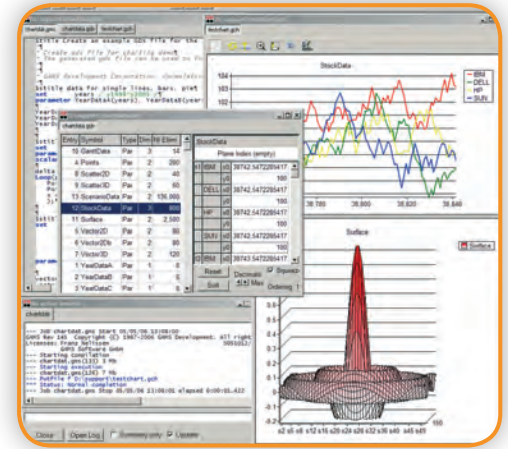
## GAMS

### 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.

### 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.



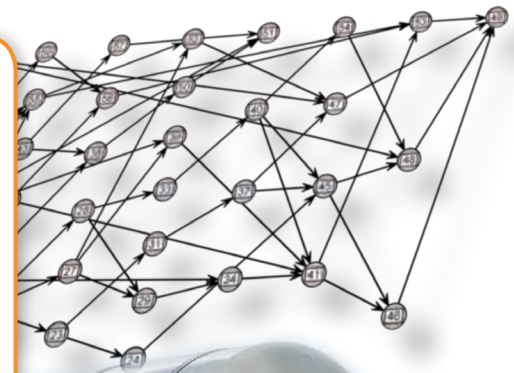
GAMS Integrated Developer Environment for editing, debugging, solving models, and viewing data.

### Transport Logistics at BASF

In a joint effort, the Rail Transport Management Team and the Scientific Computing unit at BASF have developed a model and a solution approach that provide decision support for the future structure and size of the rail car fleet. The model consists of a MILP formulation to configure the fleet structure, and an approximation from inventory

theory to determine the fleet size in the presence of the existing uncertainties. The suggested model outcome is a considerable reduction in the number of different rail car types to use and the required rail car safety stocks, which translates into major cost savings.

- Data are extracted from Excel-spreadsheets using GDXRW and the GAMS GDX-technology.
- Initial solutions for the MILP problems are derived from a graph coloring problem.
- The solution technique is polyhedral and the mipstart feature of GAMS/CPLEX is used extensively; 8 GAMS files act together.
- The GAMS/CPLEX presolve techniques reduce the mathematical problem size significantly.



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