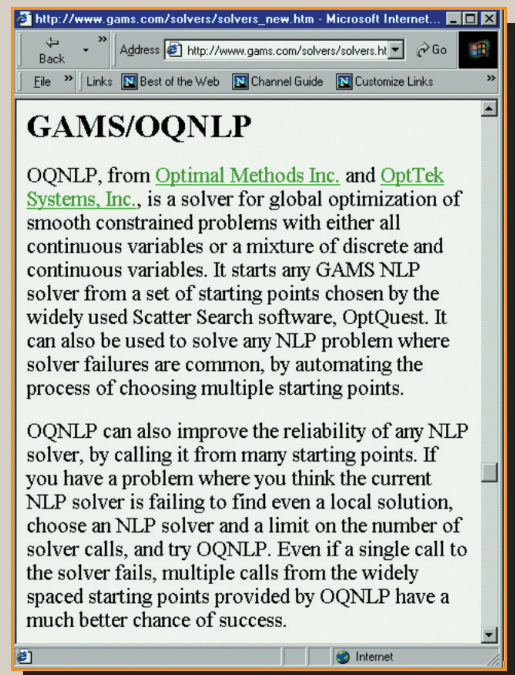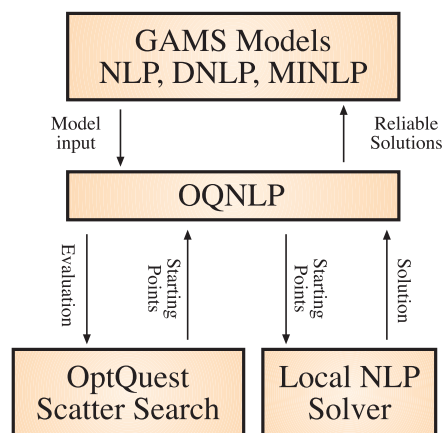# Multi-Start Solver OQNLP

High performance and reliability of solvers are the result of technological and theoretical advances in both, solution technology and modeling systems.
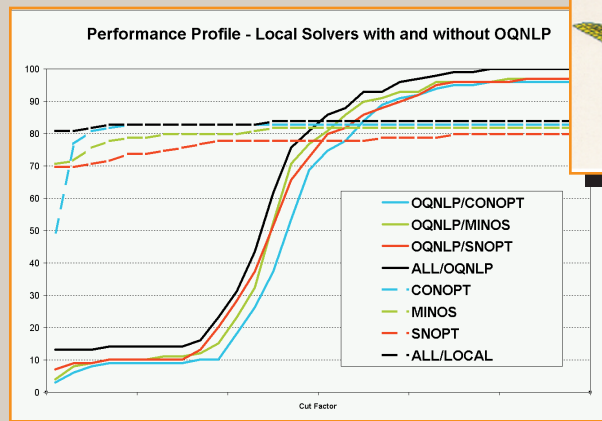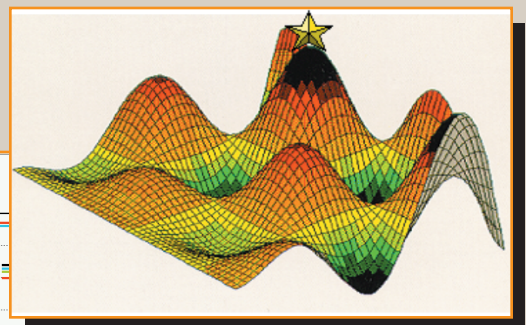
OQNLP is a multi-start heuristic algorithm designed to find global optima of smooth constrained nonlinear programs (NLPs) and mixed integer nonlinear programs (MINLPs).

GAMS/OQNLP

OQNLP, from Optimal Methods Inc. and OptTek Systems, Inc., is a solver for global optimization of smooth constrained problems with either all continuous variables or a mixture of discrete and continuous variables. It starts any GAMS NLP solver from a set of starting points chosen by the widely used Scatter Search software, OptQuest. It can also be used to solve any NLP problem where solver failures are common, by automating the process of choosing multiple starting points.

OQNLP can also improve the reliability of any NLP solver, by calling it from many starting points. If you have a problem where you think the current NLP solver is failing to find even a local solution, choose an NLP solver and a limit on the number of solver calls, and try OQNLP. Even if a single call to the solver fails, multiple calls from the widely spaced starting points provided by OQNLP have a much better chance of success.

Advantages of OQNLP:

- Improves reliability of any NLP solver by starting it from different points
- Can be applied to large scale problems
- Uses existing GAMS NLP solvers

The graph illustrates how OQNLP greatly increases our ability to find the best solutions. The known fact that multiple NLP solvers improve reliability also holds when used in conjunction with OQNLP.