Docket #: S98-087

SNOPT (TM)

SNOPT is a software package for solving large-scale optimization problems (linear and nonlinear programs). It employs a sparse SQP algorithm with limited-memory quasi-Newton approximations to the Hessian of Lagrangian. SNOPT is especially effective for nonlinear problems whose functions and gradients are expensive to evaluate. The functions should be smooth but need not be convex. An augmented Lagrangian merit function ensures convergence from an arbitrary point. Infeasible problems are treated methodically via elastic bounds on the nonlinear constraints. SNOPT allows the nonlinear constraints to be violated (if necessary) and minimizes the sum of such violations.

Applications

- General-purpose linear programming and nonlinear programming. Sparse nonlinear equations and/or inequalities.
- Engineering, Economics, Finance, Agricultural Economics.
- Trajectory optimization, Optimal control, Robotics, Engineering design, Nonlinear networks, Trade models, Portfolio analysis, Spatial equilibria.
- SNOPT is a new nonlinear solver for the algebraic modeling systems GAMS and AMPL.

Advantages

- Thread-safe (reentrant) portable code (Fortran 77). CUTE interface provided.
- Numerically stable algorithms. Global convergence.
- Needs only first derivatives.
- Optional data input from MPS files.
- Warm start capability.
- Elastic bounds on nonlinear constraints (for infeasible problems).

Publications

- P. E. Gill, W. Murray and M. A. Saunders, SNOPT: An SQP algorithm for large-scale constrained optimization, Report SOL 97-3, Systems Optimization Laboratory, Stanford University (1997). (Same as Report NA 97-2, Dept of Mathematics, University of California, San Diego, 1997).
- P. E. Gill, W. Murray and M. A. Saunders, SNOPT 5.3 User's Guide, Report NA 97-5, Dept of Mathematics, University of California, San Diego (revised 1998).

Innovators

- Philip Gill
- Walter Murray
- Michael Saunders

Licensing Contact

Evan Elder

Associate Director, Licensing and Strategic Alliances, Physica

Email