Docket #: S83-042

NPSOL (R)

NPSOL is a software package for solving constrained optimization problems (nonlinear programs). It employs a dense SQP algorithm and 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.

Applications

- General-purpose nonlinear programming.
- Engineering, Economics.
- Trajectory optimization, Optimal control, Robotics, Engineering design.
- NPSOL has been widely used as part of the NAG Fortran Library.

Advantages

- Portable code (Fortran 77). Matlab interface included. CUTE interface available.
- Numerically stable algorithms. Global convergence.
- Needs only first derivatives. Can estimate them by differences.
- Automatic computation of finite difference intervals if necessary.
- Warm start capability.

Publications

- P. E. Gill, W. Murray, M. A. Saunders and M. H. Wright, User's Guide for NPSOL (Version 4.0): a Fortran package for nonlinear programming, Report SOL 86-2, Systems Optimization Laboratory, Stanford University (1986).
- P. E. Gill, W. Murray, M. A. Saunders and M. H. Wright, Some theoretical properties of an augmented Lagrangian merit function, in P. M. Pardalos (ed.),

Advances in Optimization and Parallel Computing, North-Holland, Amsterdam, 101--128 (1992).

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