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**Nonlinear optimization.** (English)

Princeton, NJ: Princeton University Press. xii, 448 p. £ 38.95; \$ 59.50 (2006). ISBN 0-691-11915-5/hbk

This is one of the best textbooks on nonlinear optimization I know. Focus is on both theory and algorithmic solution of convex as well as of differentiable programming problems. Very helpful are many examples, exercises and interesting applications. The interested reader can find carefully formulated proofs of the results. Initial point is convex analysis including subdifferential calculus and conjugate duality. Very interesting is the approach to the formulation of (necessary and sufficient) optimality conditions which uses metric regularity and normal cones to the feasible set. The conditions are formulated both for nondifferentiable (convex) and for differentiable optimization problems. Besides Lagrangean duality also the augmented Lagrangean is investigated. In the part on algorithms besides algorithms for differentiable programming problems also algorithms for nondifferentiable convex problems are explained. Focus is on proximal point, bundle and trust region algorithms. Besides unconstrained problems also an exact penalty approach for the minimization subject to nonlinear constraints is considered. In this part, not only convergence proofs but also results on convergence speed are included.

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*Keywords* : optimality conditions; solution algorithms; duality; convex programming; nondifferentiable programming

*Classification* :

- \*90-01 Textbooks (optimization)
- 90C25 Convex programming
- 90C30 Nonlinear programming