

Book Selection

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Practical Methods of Optimization. Vol. 1: Unconstrained Optimization

R. FLETCHER

Wiley, New York, U.S.A., 1980. 120 pp. £8.80

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Excellent, but not for the faint-hearted. That just about sums up this book, which is the first of a two-volume series on the theory and practice of numerical optimization; volume two, which (believe it or not) is on constrained optimization, is to follow soon, and from the list of contents (printed on the back of volume 1) promises to be of as much depth, scope and excellence as the first. As in every book of this nature, there is the problem of satisfying the needs of both practitioners and academics. Dr Fletcher has dealt with this by using "a Jekyll and Hyde style, in which the more straightforward material is presented in simple terms, whilst some of the more difficult theoretical material is nonetheless presented rigorously, but can be avoided if necessary". Non-mathematicians, however, may well argue about the use of the word "simple"! Although little actual mathematical knowledge is assumed, an ability to cope with difficult proofs is clearly needed and I imagine that it would be difficult for a student with no previous experience in the algebra of numerical methods to get to grips with the book without help.

However, the field is covered very well and in great depth—following a study of the structure of the methods, the book is divided into Newton-like, conjugate direction, restricted step and nonlinear (and sums of squares) methods—and at the end one is very surprised to find that only 120 pages has been covered: the high price of the book is very well justified, by the high intensity. Few criticisms can be levelled at the book, the most serious probably being its lack of flow diagrams (there is only one), which can often explain an algorithm better than pages of writing; there are, however, plenty of diagrams and tables to show how the methods perform. So, not a book for someone who just wants to pick up an algorithm and use it, but a superb book to set right into the depths of the subject and enable one to use numerical optimization methods in the best possible ways.

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