Software Section

This book is an overview of modern methods and software for optimization. Because so many packages have been developed in recent years (75 packages are listed in this book), a guide like this one is extremely useful to the optimization practitioner.

The book is divided into two parts, algorithms and software. Part I describes state-of-the-art algorithms for classes of optimization problems including unconstrained optimization, nonlinear equations and least squares, linear and quadratic programming, bound constraints, general constrained optimization, network optimization and integer progamming, as well as a chapter on miscellaneous problems.

Part I is only 63 pages long – in my opinion, the authors have done an excellent job of surveying so much material in so few pages. It appears to me that all the algorithms that are considered to be best by modern algorithm designers have been covered. For instance, the chapter on linear programming describes a state-of-the-art primal-dual interior point method (although, as the authors point out, this field is changing rapidly).

Readers of *JOGO* may wonder whether global optimization is surveyed in Part I – it is not. The authors write, "We did not discuss global minimization algorithms because at present there is no widely available code for global optimization." In my opinion, this statement is an accurate description of the state of affairs. One hopes that in the future various global optimization methods will find their way into common software packages, and, at that time, a book like this one will also survey global optimization.

Part II, which is 84 pages long, is a guide to the actual software packages. For each package, there is a description of which class of optimization problems it addresses, a description of the algorithm, comments on the hardware and software requirements, a contact address and phone number (and email in many cases), and a list of references to the literature.

The guide purposely omits comparisons of performance, because, as the authors point out, there is no accepted class of test problems for so many different classes of optimization problems. In addition, no information is provided on pricing.

Included in this guide are some widely known packages like MINPACK, MINOS and IBM's OSL. There are also many packages that are lesser known. Modeling languages (i.e., software to enable a user to describe a large problem)

like AMPL are also listed. In addition, packages that include optimization as an option, such as MATLAB, are also listed.

I believe that anyone who has a need for an optimization software package should buy a copy of this book. It is an invaluable source of reference material.

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