

Special issue on nonlinear and global optimization, dedicated to Professor Joaquim João Júdice on the occasion of his sixtieth anniversary

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Published online: 13 September 2011
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Professor Joaquim João Júdice has pursued an academic career in optimization and operations research for nearly forty years. His work has been dedicated to the development, analysis, and testing of algorithms for linear and non-linear complementarity problems as well as for problems arising in non-convex and global optimization. In a large number of cases, he has addressed optimization problems from the complementarity point of view, exploiting the structure of the first order necessary conditions. He focused his attention in achieving global optimization precisely from the complementarity structure itself. A relevant aspect of his work relies on the concern of hierarchically addressing problems with increasing structure, such as the degree of non-linearity, the level of non-convexity, or the type of constraints.

Another fine feature of his work relies on his care in properly handling the numerical linear algebra component of optimization problems. The concern for a solid understanding of the numerical behavior of algorithms and their performance with the curse of dimensionality has always been present in his research. Professor Júdice's broad interests led him to tackle numerous applications of optimization in engineering and telecommunications. His research achievements are documented in nearly one hundred refereed papers, a number of them in high quality journals such as ACM Transactions on Mathematical Software, Mathematics of Computation, Mathematical Programming, SIAM Journal on Optimization, and SIAM Journal on Scientific Computing. Joaquim currently serves on several editorial journals, such as in Computational Optimization and Applications, Optimization and Engineering, and TOP.

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Since his Ph.D. in 1982 from Brunel University under the supervision of Professor Gautam Mitra, he has been in the faculty of the Department of Mathematics of the Faculty of Sciences and Technology at the University of Coimbra, where he acted as department chair and vice-dean for administration. Since the early 1990s, he has also been a full time researcher at the Instituto de Telecomunicações (a national institute for research in telecommunications having one of its locations in Coimbra), coordinating its applied mathematics group for more than a decade.

Professor Júdice has had a profound impact on the development of optimization in Portugal. He has advised or co-advised 18 M.S. students and 9 Ph.D. students and collaborated with several other young Portuguese researchers. He has had a strong influence on the development of many careers, not only from his extensive advising activity but also by wisely making his large international experience available to others and by generously helping people prepare for tenure and promotion. Across different generations, students have highly appreciated his lecturing skills and commitment to quality teaching. He has been a prolific writer of lecturer notes, always in a very clear and pedagogical style, rarely giving a course without the support of a written text.

Joaquim João Júdice has also unselfishly served the Portuguese mathematical community. He did a four-year term as president of the Portuguese International Center for Mathematics (CIM). He is about to finish a two-year term as president of the Portuguese Operations Research Society (APDIO), after having served as vice-president for four years and as editor-in-chief of the journal of the society for sixteen. His work leading these institutions has been truly outstanding: organizing or promoting a large number of high quality conferences and workshops, and getting together discussion panels and committees to bring new directions and leadership. In fact, his sixtieth anniversary is celebrated precisely at an optimization conference, Optimization 2011, the seventh meeting in a conference series launched by Joaquim himself, who organized the very first one in Coimbra in 1991 and chaired the program committee of the first five meetings.

The Portuguese and international optimization communities are thus naturally celebrating this festschrift for Joaquim João Júdice, paying tribute in the form of a special issue of TOP dedicated to him on the occasion of his sixtieth anniversary. The number is organized around the contributions of the plenary sessions of the conference Optimization 2011 which took place in the Faculdade de Ciências e Tecnologia of the Universidade Nova de Lisboa, from 24th to 27th July 2011. We are extremely grateful to the plenary speakers of the conference who have contributed the following papers:

- Global optimization of nonlinear least-squares problems by branch-and-bound and optimality constraints, by Satyajith Amaran and Nikolaos V. Sahinidis.
- An algorithm for semi-infinite polynomial optimization, by Jean Bernard Lasserre.
- A general variable neighborhood search heuristic for the capacitated vehicle routing problem with stochastic service times, by Hongtao Lei, Gilbert Laporte, and Bo Guo.
- Generalized order-value optimization, by José Mario Martínez.
- Biased random-key genetic algorithms with applications in telecommunications, by Mauricio G.C. Resende.

In addition, we are very pleased to include the following invited papers:

- Optimizing radial basis functions by D.C. programming and its use in direct search for global derivative-free optimization, by Le Thi Hoai An, A. Ismael F. Vaz, and Luís Nunes Vicente.
- Unconstrained formulation of standard quadratic optimization problems, by Immanuel Bomze, Luigi Grippo, and Laura Palagi.
- Enhancing discretized formulations: the knapsack reformulation and the star reformulation, by Luis Gouveia and Pedro Moura.
- Dynamic Lagrangian dual and reduced RLT constructs for solving 0–1 mixed-integer programs, by Hanif D. Sherali and J. Cole Smith.

We would like to thank these authors for having submitted papers of such high quality. Finally, we extend our gratitude to Joaquim João Júdice himself for giving us the opportunity to publish his survey paper:

- Algorithms for linear programming with linear complementarity constraints, by Joaquim João Júdice.

3 October 2011

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