Advances in optimization theory and applications (Baikal 2017, ICCESEN 2016 and 2017)

Oleg Khamisov & Weber Gerhard-Wilhelm

Taylor & Francis
Taylor & Francis Group

FOREWORD

Advances in optimization theory and applications (Baikal 2017, ICCESEN 2016 and 2017)

This issue of *Optimization Methods & Software* (*OMS*) is related to three very successful recent conferences on Optimization, Operational Research and related subjects, namely: the *XVII Baikal International Triennial School-Seminar 'Methods of Optimization and Their Applications'* (*BITSS – Baikal 2017*), held on 31 July to 6 August 2017, in Maksimikha, Buryatia – Irkutsk, Russia, and the two '*International Conferences on Computational and Experimental Science and Engineering*' (ICCESEN), held on 19–24 October 2016 and 4–8 October 2017, both in Kemer-Antalya, Turkey. All submissions to this Special Issue were very carefully selected and reviewed by at least two independent referees.

On the occasion of *BITSS – Baikal 2017*, the journal *OMS* invited submissions to a special issue related to our subject, *Advances in Optimization Theory and Application*, which is a central topic for both the conference and the journal. It became a part of this united Special Issue.

The conferences *ICCESEN 2016* and *ICCESEN 2017* provided an excellent stage for researchers and practitioners to promote interactions between colleagues working in various areas of mathematical science and its emerging applications. On the occasion of these two conferences, *OMS* welcomed submissions to special issues on '*Advances of Optimization in Science, Economics, Engineering and Medicine*' which became a part of the present Special Issue.

The aforementioned parts that were initiated and based on the three underlying conferences have been augmented with a number of excellent *OMS* papers which were originally regular journal submissions and coauthored by world-leading experts. We are truly glad to have these outstanding contributions in our joint *OMS* Special Issue, too.

Now, our united *OMS* Special Issue '*Advances in Optimization Theory and Applications (Baikal 2017, ICCESEN 2016 and 2017)*' consists of 11 carefully selected '*master pieces*'; these are, in alphabetical order:

- A.M. Bagirov, G. Ozturk and R. Kasimbeyli: '*A sharp augmented Lagrangian-based method in constrained nonconvex optimization*'. The suggested method consists of outer and inner loops and uses the discrete gradient method for minimizing a sharp augmented Lagrangian function. Quite a comprehensive testing on smooth and non-smooth problems is described.
- R.I. Bot, E.R. Csetnek and D. Meier: '*Inducing strong convergence into the asymptotic behaviour of proximal splitting algorithms in Hilbert spaces*'. Monotone inclusions and convex optimization problems in Hilbert space are considered. A modified Krasnosel'skii–Mann algorithm is proposed and strong convergence to the minimal norm solution is proved. Numerical experiments on the split feasibility problem in infinite dimensional space are presented.
- K. Boufi and A. Roubi: '*Prox-regularization of the dual method of centers for generalized fractional programs*'. The proposed algorithm combines the dual method of centres and the proximal point algorithm. The resulting procedure generates two sequences of dual and primal approximations for the optimal value of the problem from below and from above. Conditions of linear convergence are described.

- X.-L. Dong, Z.-X. Liu, H.-W. Liu and X.-L. Li: '*An efficient adaptive three-term extension of the Hestenes–Stiefel' conjugate gradient method*'. The advantage of the suggested method consists in the following. The search direction satisfies a sufficient descent conditions and an adaptive conjugacy condition, which under mild conditions guarantee global convergence. Numerical experiments indicate that the method is practically promising.
- S. Guminov, A. Gasnikov, A. Anikin and A. Gornov: '*A universal modification of the linear coupling method*'. Main efforts of the paper are focused on elaborating an efficient line search procedure in convex non-smooth optimization. Comparison with some other methods is given and results of numerical experiments are presented.
- S. Kolesnikova: '*A multiple-control system for nonlinear discrete object under uncertainty*'. The paper is devoted to the analytical synthesis of a control system for a nonlinear object with random uncertainty. An algorithm based on an algebraic approach is suggested and results of numerical simulations are presented.
- E. Kropat, S. Meyer-Nieberg and G.-W. Weber: '*Computational networks and systems – Homogenization of variational problems on micro-architectured networks and devices*'. Microscopic models for diffusion–advection–reaction systems in a variational form on periodic manifolds are investigated. The authors analyse solutions of the variational models. As the result, complex network models, previously considered as intractable, can now be solved by standard PDE solvers in nearly no time.
- Q. Li, X. Yan, W. Zhang and Y. Bai: '*Portfolio selection with the effect of systematic risk diversification: formulation and accelerated gradient algorithm*'. The authors propose an optimal trade-off model for portfolio selection with effect of systematic risk diversification, measured by maximum marginal systematic risk of all the risk contributors. An analysis of the model is given together with the series of numerical experiments.
- M. de los Angeles Martinez and D. Fernandez: '*A quasi-Newton modified linear-programming-Newton method*'. The authors consider the problem of solving constrained system of nonlinear equations. A computationally simple modification of the Linear-Programming-Newton method is suggested and tested.
- M. Momeni and M.R. Peyghami: '*A new conjugate gradient algorithm with cubic Barzilai–Borwein stepsize for unconstrained optimization*'. A new conjugate gradient algorithm in Dai-Liao family is described. Convergence analysis as well as the testing results on well-known set of problems with the dimension up to 10,000 variables are given.
- R.M. Oliveira, E.S. Helou, and E.F. Costa: '*String-averaging incremental stochastic subgradient algorithms*'. Constrained convex stochastic optimization problems with the objective defined as a sum of convex functions are considered. Incremental stochastic subgradient algorithms are used. Convergence analysis and testing results are given.

We, guest editors, are very thankful to all the *Authors* for accepting our invitation to submit their interesting papers to the journal *OMS* and, eventually, this Special Issue, and to all the *Anonymous Referees* who did a great service in carefully reviewing all the submissions.

We express our gratitude to the members of the *BITSS – Baikal 2017s* Program Committee, chaired by *Professor Yurii G. Evtushenko,* and the members of the Organizing Committee for supporting publication of the underlying special issue.

Furthermore, we express our thanks to the Chair of the series of conferences *ICCESEN, Professor Iskender Akkurt*, for encouraging and supporting publication of the underlying special issues, and we convey our gratitude to the Scientific and the Organizing Committees chaired by him.

Now, as Guest Editors, we wish all the readers a pleasant and enjoyable, instructive and inspiring study of the articles of this special issue. We sincerely hope that our special issue will

contribute to the success of *Optimization Methods & Software* as a premium journal of academic excellence, which strongly supports mathematical science and its application areas in all over the world!

Oleg Khamisov
Melentiev Energy System Institute, Siberian Branch of the Russian Academy of Sciences,
Irkutsk, Russia,
✉ globopt@mail.ru

Gerhard-Wilhelm Weber
Faculty of Engineering Management, Poznan University of Technology, Poznan, Poland
Institute of Applied Mathematics, METU, Ankara, Turkey

Check for updates