# EDITORIAL

Jan Chleboun, Praha

Let me write a few paragraphs about this special issue and the difference between this and the other special issues that the Journal has regularly been publishing in recent years.

Readers acquainted with Applications of Mathematics (AM) are aware that the vast majority of papers published in the Journal follow the theorem-proof style. This is a well established tradition in the community of mathematicians. Many applied mathematicians are no exception. On the other hand, they often work among and cooperate with experts in engineering interested in computer simulations. Unlike the former, the latter are specialists typically sharing a tradition that differs in putting less emphasis on new theorems and their proofs but investing much effort in computational modeling and experiments.

Although it may seem strange for some foreign readers, a sad truth is, at least in the home country of AM, that the two communities are more separated as one would think, given the shared orientation on applications and the shared use of advanced mathematical and numerical tools.

The goal of this special issue is (a) to open the door to papers that do not strictly follow the theorem-proof path but put more accent on computing, and, consequently, (b) to attract computationally-oriented authors who otherwise might consider AM an inappropriate journal for their work. As a result, seven manuscripts have materialized into this issue. Moreover, an unexpected feature has emerged. Four of the papers are the work of young researchers or young researchers supervised by a distinguished scientist. This can be felt as a reminder of an idea associated with the establishment of the Journal. Besides other reasons, it was founded also as a platform for young scientists.

Another connection to the traditional features of AM has arisen by chance in the papers by E. Janouchová et al. and R. Blaheta et al. These two groups deal with uncertainty quantification and their work merges the finite element method and probability, two fields the Journal has focused on for many years.

Let us take a closer look at all the papers comprising this special issue.

DOI: 10.21136/AM.2018.0309-18 

In the first paper, R. Kohut deals with solving geotechnical elasticity problems by the preconditioned conjugate gradient method with a two-level additive Schwarz preconditioner implemented as a parallel algorithm. Four different aggregation techniques are considered on the coarse grid and tested by solving a geocomposite and a rock mass tunnel problems, where various material properties and meshes are considered.

The paper by P. Vaněk and R. Tezaur also concentrates on a two-level method, but from a different perspective. They infer and partially test a convergence result related to a proposed massive polynomial smoothing and aggressive coarsening.

P. Salač presents a paper about the shape optimization of a glass vase made by a melted glass molding technique. The shape of an insulating layer is optimized to achieve a target temperature on a plunger surface.

In the paper by R. Blaheta, M. Béreš, S. Domesová, and P. Pan, methods for the identification of parameters of a second order boundary value problem are studied. Although the paper begins with a deterministic inverse problem, more emphasis is put on the Bayesian inverse problem combined with the Metropolis-Hastings algorithm and its modification.

A similar but fully deterministic identification problem is the subject of the paper by J. Havelka and J. Sýkora who present numerous computational experiments and aims at applications in civil engineering.

E. Janouchová, J. Sýkora, and A. Kučerová deal with a frame structure failure probability, a stochastic benchmark problem modeled via a polynomial chaos approach. Various numerical methods are described and then compared through computational tests.

The paper by M. Balázsová, M. Feistauer, J. Horáček, M. Hadrava, and A. Kosík closes the issue. It concerns the space-time discontinuous Galerkin method applied to problems of the interaction of a compressible flow and an elastic structure. Numerical experiments focus on a vocal folds model.

I thank all the authors contributing to this special issue for their papers. I am also grateful to the referees for the time and effort they put into reviewing the submitted manuscripts.

*Author's address*: *Jan Chleboun*, Department of Mathematics, Faculty of Civil Engineering, Czech Technical University in Prague, Thákurova 7, 166 29 Praha 6, e-mail: `jan.chleboun@cvut.cz`.