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Matrix Equations and Symmetry

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Message from the Guest Editors

Dear Colleagues,

Algebraic and differential matrix equations arise in many different applications areas, e.g., in control theory, model order reduction, uncertainty quantification, signal processing, discretizations of deterministic and stochastic PDEs, and matrix regression problems, to name only a few. In recent decades, there has been a strong and steadily increasing research interest in this topic which has led to many new substantial results regarding both theoretical insights and numerical solution strategies. For instance, various recent developments using low-rank matrix approximations have paved the way for handling high-dimensional matrix equations. Symmetry arises in the context of matrix equations in different forms, such as equations defined by symmetric coefficient matrices, equations allowing symmetric solutions or solution structures. Hence, the need arises to exploit these symmetric structures in both theoretical analysis and numerical methods.

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Message from the Editor-in-Chief

Symmetry is ultimately the most important concept in natural sciences. It is not surprising then that very basic and fundamental research achievements are related to symmetry. For instance, the Nobel Prize in Physics 1979 (Glashow, Salam, Weinberg) was received for a unified symmetry description of electromagnetic and weak interactions, while the Nobel Prize in Physics 2008 (Nambu, Kobayashi, Maskawa) was received for the discovery of the mechanism of spontaneous breaking of symmetry, including CP symmetry. Our journal is named *Symmetry* and it manifests its fundamental role in nature.

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