Special Volume of the METT-X Workshop Aachen 2023

This volume of Electronic Transactions on Numerical Analysis (ETNA) contains selected papers by participants of the international METT-X Workshop Aachen 2023, which was held at the Institut für Geometrie und Praktische Mathematik at the RWTH Aachen University from September 13–15, 2023. The workshop was the 10th in a series of workshops on *Matrix Equations and Tensor Techniques*.

The METT workshops first started out as an informal meeting of people in Germany working on matrix equations, such as algebraic Riccati and Lyapunov equations arising in control. This first meeting was held at the Max Planck Institute for Mathematics in the Sciences in Leipzig, Germany, in 2005. In 2007, another workshop, organized at TU Chemnitz, already had an international attendance, in particular from the Italian community. The focus of the following workshops continued to be on the latest developments in the theory, computation, and applications of linear and nonlinear matrix equations, which was later on expanded to tensor equations and techniques to solve them. The workshop series continued bi-annually with further instances in Braunschweig (2009), Aachen (2011), Lausanne (2013), Bologna (2015), Pisa (2017), Magdeburg (2019), and Perugia (2021). METT-X thus marked the milestone of the tenth workshop in the series, which we celebrate with this special volume. The series of METT workshops continues with its eleventh edition in Leuven, Belgium, January 7–9, 2026.

At METT-X, there were two invited talks by Davide Palitta (Università di Bologna, Italy) and Laura Grigori (EPFL, Lausanne, Switzerland), and 22 contributed talks. Davide Palitta delivered a lecture titled "Sketched and truncated Krylov subspace methods for matrix equations", while Laura Grigori spoke about "Randomization techniques for solving large scale linear algebra problems". The contributed talks included numerical solution of quadratic matrix equations, algebraic Riccati equations, Lyapunov and Stein matrix equations; tensor decomposition and approximation; low-rank approximation and optimization. These topics are also reflected in the papers published in this volume.

The Steering Committee of METT-X consisted of the authors of this preface who at the same time served as guest editors for this special volume. The local organizing committee was formed by Lars Grasedyck and Tim A. Werthmann (RWTH Aachen University, Germany).

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