



Contribution ID: 29

Type: **Poster**

New-Type Matrix Equations Arising in Model-Order Reduction: State-of-the-Art and Challenges

Thursday 7 November 2019 15:00 (2 hours)

Matrix equations and their solutions play a key role in several problems arising in science and engineering. Our primary focus lies on matrix equations appearing in model-order reduction problems, where several well-known procedures, such as balanced truncation and interpolation-based methods, can be set up in the matrix equations form. In the last five years, several model reduction schemes for various classes of systems have been proposed. These classes include quadratic-bilinear, polynomial, switched systems and quadratic output systems. The newly proposed MOR schemes for these classes require to solve particular types of matrix equations. In this poster, we provide an overview of the MOR methods and the newly arising matrix equations. Furthermore, we discuss the current methods to solve these matrix equations and the challenges in a large-scale setting.

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Session Classification: Posters

Track Classification: Posters