Robust computational methods for system and control theory

Zlatko Drmač
Faculty of Science, Department of Mathematics, University of Zagreb

Abstract. We discuss the importance of robust and accurate implementation of core numerical linear algebra procedures in computational methods for system and control theory. In particular, we stress the importance of error and perturbation analysis that identifies relevant condition numbers and guides computation with noisy data, and careful software implementation. The themes used as case studies include rational matrix valued least squares fitting (e.g. least squares fit to frequency response measurements of an LTI system), model order reduction issues (e.g. the Discrete Empirical Interpolation Method (DEIM)), accurate computation with structured matrices such as scaled Cauchy, Vandermonde and Hankel matrices.