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## Multidimensional Rational Covariance Extension with Applications to Spectral Estimation

### Abstract

The rational covariance extension problem (RCEP) is an important problem in systems and control occurring in such diverse fields as control, estimation, system identification, and signal and image processing, leading to many fundamental theoretical questions. In fact, this inverse problem is a key component in many identification and signal processing techniques and plays a fundamental role in prediction, analysis, and modeling of systems and signals. It is well-known that the RCEP can be reformulated as a (truncated) trigonometric moment problem subject to a rationality condition. In this work we consider the more general multidimensional trigonometric moment problem with a similar rationality constraint. This generalization creates many interesting new mathematical questions and also provides new insights into the original one-dimensional problem. A key concept in this approach is the complete smooth parametrization of all solutions, allowing solutions to be tuned to satisfy additional design specifications without violating the complexity constraints. As an illustration of the potential of this approach we apply our results to multidimensional spectral estimation and image compression.

Talk time: 7/21/2016 3:00PM— 7/21/2016 3:20PM

Talk location: Cupples I Room 113

Special Session: Finite and infinite dimensional moment problems. Organized by M. Infusino, S. Kuhlmann, and T. Kuna.