Numerical Analysis and Scientific Computing Seminar

A structured QZ method for colleague matrix pencils

Paola Boito

Universite' de Limoges - CNRS

Abstract: In this work we present a fast structured version of the QZ algorithm designed to compute the generalized eigenvalues of a class of matrix pencils. In particular, this class includes colleague pencils arising from the zero-finding problem for polynomials expressed in the Chebyshev basis. The method relies on quasiseparable matrix structure and it is based on the representation of the relevant matrices as low rank perturbations of Hermitian or unitary matrices. The complexity for an $N \times N$ pencil is $\mathcal{O}(N^2)$, with $\mathcal{O}(N)$ memory. Numerical experiments confirm the effectiveness and practical stability of the method.

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This is joint work with Yuli Eidelman (Tel-Aviv) and Luca Gemignani (Pisa).

Mathematics and Computer Science

Emory University