Contribution ID: **11**   Type: **Talk**

Error bounds for the approximation of matrix functions with rational Krylov methods

Monday, 25 September 2023 11:40 (20 minutes)

In this talk we present some error bounds for the approximation of matrix-vector products $f(A)b$ and quadratic forms $b^T f(A)b$ with a matrix function $f(A)$, for a Hermitian matrix A and a vector b by means a rational Krylov subspace method. The error bounds are obtained by exploiting properties of rational Arnoldi decompositions and the Cauchy integral formula to link the matrix function error to the residuals of shifted linear systems. This theory leads to both a priori and a posteriori bounds for the error, and it generalizes the bounds derived in [T. Chen, A. Greenbaum, C. Musco, and C. Musco, SIMAX, 2022] for the Lanczos method to the rational Krylov case. The accuracy of the bounds is demonstrated with several numerical experiments.

Primary author: SIMUNEC, Igor (Scuola Normale Superiore di Pisa)

Presenter: SIMUNEC, Igor (Scuola Normale Superiore di Pisa)

Session Classification: Contributed talks