

NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING
SEMINAR

Estimating bilinear forms via extrapolation

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Abstract: A spectrum of applications arising from Statistics, Machine Learning, Network Analysis require computation of bilinear forms $x^T f(A)y$, where A is a diagonalizable matrix and x, y are given vectors. In this work we are interested in efficiently computing bilinear forms primarily due to their importance in several contexts. For large scale computation problems it is preferable to achieve approximations of bilinear forms without exploiting the whole matrix function. For this purpose an extrapolation procedure has been developed, attaining the approximation of bilinear forms with one, two or three term estimates in a complexity of square order. The extrapolation procedure gives us the flexibility to define the moments of a matrix A either directly or through the polarization identity. The presented approach is characterized by easy applicable formulae of low complexity that can be implemented in vectorized form.

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