

Estimating matrix functionals via extrapolation

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Abstract

A spectrum of applications arising from Statistics, Machine Learning, Network Analysis require the computation of matrix functionals of the form $x^T f(A)y$, 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 the bilinear forms avoiding the explicit computation of the matrix function. For this purpose an extrapolation procedure has been developed, attaining the approximation of the bilinear form 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.

References

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