Spectral Shorted Matrices

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Abstract

Given a \( n \times n \) positive semidefinite matrix \( A \) and a subspace \( S \) of \( \mathbb{C}^n \), \( \Sigma(S, A) \) denotes the shorted matrix of \( A \) to \( S \). We consider the notion of spectral shorted matrix

\[
\rho(S, A) = \lim_{m \to \infty} \frac{\Sigma(S, A^{m})}{m^{1/m}}.
\]

We completely characterize this matrix in terms of \( S \) and the spectrum and the eigenspaces of \( A \). We show the relation of this notion with the spectral order of matrices and the Kolmogorov’s complexity of \( A \) to a vector \( \xi \in \mathbb{C}^n \).