Distribution of the squared first antieigenvalue

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Abstract

For fifty years ago Karl Gustafson published a series of papers and developed an antieigenvalue theory which has been applied, in a non-statistical manner, to several different areas including, numerical analysis and wavelet analysis, quantum mechanics, finance and optimisation. The first antieigenvector $\mathbf{u}_1$ (actually there are two) is the vector which is the one which is the most "turned" by an action of a positive definite matrix $\mathbf{A}$ with a connected antieigenvalue μ_1 which indeed is the cosine of the maximal "turning" angle given as

$$\mu_1 = \frac{2\sqrt{\lambda_1 \lambda_p}}{\lambda_1 + \lambda_p},$$

where λ_1 is the largest and λ_p is the smallest eigenvalue of $\mathbf{A}$, respectively. Antieigenvalues have been introduced in statistics, for example, as a measures of efficiency of least squares estimators, and when testing for sphericity, see [1, 2, 3]. In this talk we will consider the distribution of the squared first antieigenvalue and discuss the use of it.

Keywords

Eigenvalue, Aniteigenvalue, Probability distribution.

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