Perturbation of Partitioned Hermitian Generalized Eigenvalue Problem

Ninoslav Truhar

We are concerned with the perturbation of a multiple eigenvalue μ of the Hermitian matrix $A = \mathrm{diag}(\mu I, A_{22})$ when it undergoes an off-diagonal perturbation E whose columns have widely varying magnitudes. When some of E's columns are much smaller than the others, some copies of μ are much less sensitive than any existing bound suggests. We explain this phenomenon by establishing individual perturbation bounds for different copies of μ. They show that when $A_{22} - \mu I$ is definite the ith bound scales quadratically with the norm of the ith column, and in the indefinite case the bound is necessarily proportional to the product of E's ith column norm and E's norm. An extension to the generalized Hermitian eigenvalue problem is also presented.

This talk is based on joint results with: **Ren-Cang Li**, University of Texas at Arlington, Arlington, TX, USA; **Yuji Nakatsukasa**, School of Mathematics, The University of Manchester, Manchester, UK; **Wei-guo Wang**, School of Mathematical Sciences, Ocean University of China, Qingdao, P.R. China