

1096-65-1559

Howard C Elman* (elman@cs.umd.edu) and **Minghao Wu.** *Robust Methods for Eigenvalue Computations in Linear Stability Analysis.*

In linear stability analysis of a large-scale dynamical systems, we need to compute the rightmost eigenvalue(s) for a series of large generalized eigenvalue problems. Existing iterative eigenvalue solvers are not robust when no estimate of the rightmost eigenvalue(s) is available. In this study, we show that such an estimate can be obtained from Lyapunov inverse iteration applied to a special eigenvalue problem of Lyapunov structure. An analysis that explains the fast convergence of this algorithm observed in numerical experiments is provided, based on which we propose a more efficient and robust algorithm. Furthermore, we generalize the same idea to a deflated version of this Lyapunov eigenvalue problem and propose an algorithm that computes a few rightmost eigenvalues for the eigenvalue problems arising from linear stability analysis. (Received September 16, 2013)