Computing Tight Bounds on Extreme Eigenvalues of Symmetric Matrices

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Abstract—This paper is concerned with verifying the accuracy of computed matrix eigenvalues, especially minimum or maximum eigenvalue of a symmetric matrix. It is useful to compute sharp bounds on such extreme eigenvalues because it becomes essentially important (and frequently ineludible) in verified numerical computations, e.g. for solutions of linear and nonlinear systems. In this paper, an algorithm for computing tight bounds for the extreme eigenvalues is developed for symmetric matrices. Numerical results are presented showing the performance of the proposed algorithm.