INEXACT NEWTON PRECONDITIONING TECHNIQUES FOR LARGE SYMMETRIC EIGENVALUE PROBLEMS*

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Abstract. This paper studies a number of Newton methods and use them to define new secondary linear systems of equations for the Davidson eigenvalue method. The new secondary equations avoid some common pitfalls of the existing ones such as the correction equation and the Jacobi-Davidson preconditioning. We will also demonstrate that the new schemes can be used efficiently in test problems.

Key words. sparse matrix eigenvalue problem, Newton method, preconditioning for eigenvalue method.

AMS subject classifications. 65F50, 65F15.

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