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A COUNTEREXAMPLE FOR CHARACTERIZING AN INVARIANT SUBSPACE OF A MATRIX*

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Abstract. As an alternative to Newton's method for computing a simple eigenvalue and corresponding eigenvectors of a nonnormal matrix in a stable way, an approach based on singularity theory has been proposed by Schwetlick/Lösche [Z. Angew. Math. Mech., 80 (2000), pp. 9–25]. In this paper, by constructing a counterexample with a singular linear block operator, it is shown that a straightforward extension of this technique to the computation of invariant subspaces of dimension $p > 1$ will not work, in general. Finding this counterexample required a detailed study of the linear block operator.

Key words. Eigenvalue problem, simple invariant subspace, block Newton method, block Rayleigh quotient iteration.

AMS subject classifications. 65F15.

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