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# A COUNTEREXAMPLE FOR CHARACTERIZING AN INVARIANT SUBSPACE OF A MATRIX*

HUBERT SCHWETLICK† AND KATHRIN SCHREIBER‡

**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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† Technische Universität Dresden, Fakultät Mathematik und Naturwissenschaften, Institut für Numerische Mathematik, 01062 Dresden, Germany (hubert.schwetlick@tu-dresden.de).

‡ Technische Universität Berlin, Institut für Mathematik, MA 4-5, Straße des 17. Juni 136, 10623 Berlin, Germany (schreibe@math.tu-berlin.de). The research of this author is supported by the DFG Research Center MATHEON in Berlin.