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ON THE SINGULAR TWO-PARAMETER EIGENVALUE PROBLEM[*]

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Abstract. In the 1960s, Atkinson introduced an abstract algebraic setting for multiparameter eigenvalue problems. He showed that a nonsingular multiparameter eigenvalue problem is equivalent to the associated system of generalized eigenvalue problems. Many theoretical results and numerical methods for nonsingular multiparameter eigenvalue problems are based on this relation. In this paper, the above relation to singular two-parameter eigenvalue problems is extended, and it is shown that the simple finite regular eigenvalues of a two-parameter eigenvalue problem and the associated system of generalized eigenvalue problems agree. This enables one to solve a singular two-parameter eigenvalue problem by computing the common regular eigenvalues of the associated system of two singular generalized eigenvalue problems.

Key words. Singular two-parameter eigenvalue problem, Operator determinant, Kronecker canonical form, Minimal reducing subspace.

AMS subject classifications. 15A18, 15A69, 65F15.