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HOMOGENEOUS JACOBI–DAVIDSON*

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Abstract. We study a homogeneous variant of the Jacobi–Davidson method for the generalized and polynomial eigenvalue problem. While a homogeneous form of these problems was previously considered for the subspace extraction phase, in this paper this form is also exploited for the subspace expansion phase and the projection present in the correction equation. The resulting method can deal with both finite and infinite eigenvalues in a natural and unified way. We show relations with the multihomogeneous Newton method, Rayleigh quotient iteration, and (standard) Jacobi–Davidson for polynomial eigenproblems.

Key words. homogeneous form, quadratic eigenvalue problem, generalized eigenvalue problem, polynomial eigenvalue problem, infinite eigenvalues, correction equation, subspace method, subspace expansion, large sparse matrices, bihomogeneous Newton, multihomogeneous Newton, Rayleigh quotient iteration, Jacobi–Davidson

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