

## ALGEBRAIC PROPERTIES OF THE BLOCK GMRES AND BLOCK ARNOLDI METHODS\*

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**Abstract.** The solution of linear systems of equations with several right-hand sides is considered. Approximate solutions are conveniently computed by block GMRES methods. We describe and study three variants of block GMRES. These methods are based on three implementations of the block Arnoldi method, which differ in their choice of inner product.

**Key words.** block method, GMRES method, Arnoldi method, matrix polynomial, multiple right-hand sides, block Krylov subspace, Schur complement, characteristic polynomial.

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