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EVENTUALLY CYCLIC MATRICES AND A TEST FOR STRONG EVENTUAL NONNEGATIVITY*

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Abstract. Eventually r-cyclic matrices are defined, and it is shown that if A is an eventually r-cyclic matrix A having $\operatorname{rank} A^2 = \operatorname{rank} A$, then A is r-cyclic with the same cyclic structure. This result and known Perron-Frobenius theory of eventually nonnegative matrices are used to establish an algorithm to determine whether a matrix is strongly eventually nonnegative (i.e., is an eventually nonnegative matrix having a power that is both irreducible and nonnegative).

Key words. Eventually nonnegative matrix, Eventually r-cyclic matrix, Strongly eventually nonnegative matrix, Perron-Frobenius.

AMS subject classifications. 15B48, 05C50, 15A18.

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