SIGN PATTERNS THAT ALLOW STRONG EVENTUAL NONNEGATIVITY

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Abstract. A new class of sign patterns contained in the class of sign patterns that allow eventual nonnegativity is introduced and studied. A sign pattern is potentially strongly eventually nonnegative (PSEN) if there is a matrix with this sign pattern that is eventually nonnegative and has some power that is both nonnegative and irreducible. Using Perron-Frobenius theory and a matrix perturbation result, it is proved that a PSEN sign pattern is either potentially eventually positive or r-cyclic. The minimum number of positive entries in an $n \times n$ PSEN sign pattern is shown to be $n$, and PSEN sign patterns of orders 2 and 3 are characterized.

Key words. Potentially eventually nonnegative, Potentially strongly eventually nonnegative, Sign pattern.

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