INERTIA SETS ALLOWED BY MATRIX PATTERNS

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Abstract. Motivated by the possible onset of instability in dynamical systems associated with a zero eigenvalue, sets of inertias $S_n$ and $S^*_n$ for sign and zero-nonzero patterns, respectively, are introduced. For an $n \times n$ sign pattern $A$ that allows inertia $(0, n - 1, 1)$, a sufficient condition is given for $A$ and every superpattern of $A$ to allow $S_n$, and a family of such irreducible sign patterns for all $n \geq 3$ is specified. All zero-nonzero patterns (up to equivalence) that allow $S^*_3$ and $S^*_4$ are determined, and are described by their associated digraphs.

Key words. Sign pattern, Zero-nonzero pattern, Inertia, Digraph.

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