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Xiaofeng Chen, Wei Fang, Wei Gao, Yubin Gao, Guangming Jing, Zhongshan Li*
(zli@gsu.edu), **Yanling Shao** and **Lihua Zhang**. *Essential sign change numbers of full sign pattern matrices.*

A sign pattern (matrix) is a matrix whose entries are from the set $\{+, -, 0\}$ and a sign vector is a vector whose entries are from the set $\{+, -, 0\}$. A sign pattern or sign vector is full if it does not contain any zero entries. The minimum rank of a sign pattern matrix \mathcal{A} is the minimum of the ranks of the real matrices whose entries have signs equal to the corresponding entries of \mathcal{A} . The notions of essential row sign change number and essential column sign change number are introduced for full sign patterns and condensed sign patterns. By inspecting the sign vectors realized by a list of real polynomials in one variable, a lower bound on the essential row and column sign change numbers is obtained. Using point-line configurations on the plane, it is shown that even for full sign patterns with minimum rank 3, the essential row and column sign change numbers can differ greatly and can be much bigger than the minimum rank. Some open problems concerning square full sign patterns with large minimum ranks are discussed. (Received September 19, 2016)