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Xinlei Feng, Wei Gao, Frank J. Hall, Guangming Jing, Zhongshan Li* (zli@gsu.edu),
Christopher Zagrodny and **Jiang Zhou**. *Sign pattern matrices that allow diagonalizability.*

In this talk, we explore sufficient and/or necessary conditions for a sign pattern to allow diagonalizability. It is known that for each $k \geq 4$, there exists an irreducible sign pattern with minimum rank k that does not allow diagonalizability. However, we show that every square sign pattern A with minimum rank 2 that has no zero line allows diagonalizability with rank 2 and also with rank equal to the maximum rank of the sign pattern. In particular, every irreducible sign pattern with minimum rank 2 allows diagonalizability. On the other hand, an example is given to show the existence of a square sign pattern with minimum rank 3 and no zero line that does not allow diagonalizability; however, the case for irreducible sign patterns with minimum rank 3 remains open. In addition, for a sign pattern that allows diagonalizability, the possible ranks of the diagonalizable real matrices with the specified sign pattern are shown to be lengths of certain composite cycles. Several other results on some special classes of sign patterns that allow diagonalizability are also obtained. In particular, some results are extended to sign pattern matrices whose maximal zero submatrices are “strongly disjoint”. (Received January 25, 2019)