Akbari, S.; Ghafari, A.; Kazemian, K.; Nahvi, M.
Some criteria for a signed graph to have full rank. (English) Zbl 1441.05097

Summary: A weighted graph $G^\omega$ consists of a simple graph $G$ with a weight $\omega$, which is a mapping, $\omega : E(G) \to \mathbb{Z} \setminus \{0\}$. A signed graph is a graph whose edges are labelled with $-1$ or $1$. In this paper, we characterize graphs which have a sign such that their signed adjacency matrix has full rank, and graphs which have a weight such that their weighted adjacency matrix does not have full rank. We show that for any arbitrary simple graph $G$, there is a sign $\sigma$ so that $G^\sigma$ has full rank if and only if $G$ has a $\{1,2\}$-factor. We also show that for a graph $G$, there is a weight $\omega$ so that $G^\omega$ does not have full rank if and only if $G$ has at least two $\{1,2\}$-factors.

MSC:
05C22 Signed and weighted graphs
05C50 Graphs and linear algebra (matrices, eigenvalues, etc.)

Keywords: weighted graph; signed graph; weighted adjacency matrix; signed adjacency matrix; rank

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References:

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