

Patterns of symmetric matrices that allow all the eigenvalue multiplicities to be even

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Let G be an undirected graph on n vertices and let $S(G)$ be the set of all real symmetric $n \times n$ matrices whose nonzero off-diagonal entries occur in exactly the positions corresponding to the edges of G . The Inverse Eigenvalue Problem for a graph G is a problem of determining all possible lists that can occur as the lists of eigenvalues of matrices in $S(G)$. This question is, in general, hard to answer and several variations of the problem have been studied, most notably the minimum rank problem. In this talk, we will discuss some questions related to the Inverse Eigenvalue Problem for a graph related to the possible multiplicities of the eigenvalues that can occur for a matrix in $S(G)$. Of particular interest will be the question, when there exists a matrix $A \in S(G)$ whose eigenvalues all have even multiplicities.

This is a joint work with P. OBLAK (University of Ljubljana).