GRADUATE SEMINAR

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A Smörgåsbord of Cycles, Matchings, and Multiplicities

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Abstract:

One of the most important historical contributions to the inverse eigenvalue problem associated with trees is the celebrated Parter-Wiener Theorem. This theorem states for any tree, T, and any associated real symmetric matrix, A, with a corresponding eigenvalue λ of multiplicity at least two, there exists some vertex v in T that, upon deletion from T, results in a strict increase in the multiplicity of the eigenvalue λ ; however, there is no analogous result that can be extended beyond trees using the characteristic polynomial. In this presentation, we study a different polynomial, called the *weighted matching polynomial*, and its related graphical properties such as matchings and vertex-deleted subgraphs in order to derive properties on the roots and their multiplicities. For graphs containing a Hamilton path, we are able to establish a special case of the extended Parter-Wiener Theorem for hollow matrices.



