GRADUATE SEMINAR

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A Fortuitous Friendship between the Matching Polynomial and the Companion Matrix

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Abstract: For any matrix associated to a graph, the connection between the properties of the graph and the algebraic properties of the matrix have long since been of interest. Historically, the characteristic polynomial has primarily been the tool to algebraically represent the graph. However, the weighted matching polynomial has recently been a topic of interest due to its inherent connection to graphical properties.

In this presentation, we study the roots of the weighted matching polynomial in relation to the companion matrix to establish a new classification of graphs called SRSI graphs. These graphs have simple roots where the roots of a vertex-deleted subgraph strictly interlace the roots of the graph. For all graphs, we are able to characterize how the multiplicity of each root changes once a vertex is deleted.

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