Swarthmore College
Mathematics & Statistics Department
Colloquium

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The inverse eigenvalue problem: which graphs admit an orthogonal symmetric matrix?

In this talk, we will give an introduction to the inverse-eigenvalue problem for graphs (IEPG) and then we will discuss one specific sub-problem of the IEPG. Let G be a graph and define S(G) to be the set of real and symmetric matrices whose zero/nonzero pattern respects G (with diagonal entries having no restriction). What sets of eigenvalues can matrices in this family have? This is called the IEPG and is one of the fundamental problems in combinatorial matrix theory.

Let q(G) denote the minimum number of distinct eigenvalues of any matrix in S(G). It is straightforward to see (and I will prove in the talk) that q(G) is less than or equal to 2 if and only if S(G) contains a symmetric orthogonal matrix. Classifying graphs with q(G) = 2 is a difficult problem which is not close to being solved. We will discuss recent results about such graphs.

Tuesday, April 28

4:15pm Refreshments, 4:30pm Lecture

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