Path Partitioning And Painting

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3/4/2011

Breeanne will speak on the following: Given a graph G and a set T of k vertices, a k-fixed-endpoint path partition of G with respect to T is a set of vertex-disjoint paths which cover the vertices of G and in which every vertex in T is an endpoint of a path. The k-fixed-endpoint path partition problem is to find the minimum size of such a path partition. In general, this problem is NP-hard; however, solutions are possible for certain graph classes. This talk focuses on a solution to this problem for trees and threshold graphs.

Kathleen will speak on the following: Given a 2-edge colored graph on n vertices, we define the degree matrix M as the (2 x n) matrix whose entry d_{ij} is the degree of color i at vertex v_j, where $1 \leq i \leq 2$ and $1 \leq j \leq n$. Given such a matrix M, we address the question of when M is the degree matrix of a disjoint union of paths. Surprisingly, in the seemingly most basic case, the question is equivalent to the constrained number partition problem, which in itself is a special version of the NP hard subset sum problem. In other cases, we discuss necessary and sufficient conditions for when M is a realizable as a set of paths and we present constructive algorithms for producing these realizations.