

Discrete Mathematics Seminar

Time: Friday, 5 March 2010, 12:30-1:30 PM

Room: 238 Derrick Hall

Title: Sliding Puzzles and Rotating Puzzles on Graphs

Speaker: Dr. Chao Yang, Mathematics Department

Abstract:

Sliding puzzles on graphs are generalization of the Fifteen Puzzle. Wilson has shown that the sliding puzzle on a 2-connected graph always generates all even permutations of the tiles on the vertices of the graph, unless the graph is isomorphic to a cycle or the graph \mathbb{Z}_0 [Graph puzzles, homotopy, and the alternating group. *J. Combin. Theory Ser. B*, **16** (1974), 86-96].

In a rotating puzzle on a graph, tiles are allowed to be rotated on some of the cycles of the graph. It is shown by Scherphuis that all even permutations of the tiles are also obtainable for the rotating puzzle on a 2-edge-connected graph, except for a few cases.

In this talk, the Scherphuis Theorem is generalized to every connected graph, and the Wilson Theorem is derived from the generalized Scherphuis Theorem, which will give a uniform treatise for these two families of puzzles and show the structural relation of the graphs of the two puzzles.