Discrete Mathematics Seminar

Time: Friday, 21 March 2014, 1:00 – 2:00 PM
Location: 238 Derrick Hall
Title: The Critical Group of a Graph
Speaker: Dr. Peter Sin, Department of Mathematics, University of Florida

Abstract:

The Laplacian matrix of a graph is the matrix L=D-A where D is the diagonal matrix of degrees and A is the adjacency matrix. The abelian group defined by L, is an important invariant of the graph. For example, its torsion subgroup, called the critical group, has order equal to the number of spanning trees if the graph is connected. The critical group also has an interesting interpretation in terms of the chip-firing game (or sandpile automaton) on a graph. In this talk, I will describe these connections and discuss how the critical group can be computed for various families of graphs, including the recent computation for Paley graphs, using representation theory and number theory.

Bio:

Peter Sin received the B.Sc. degree in mathematics from the University of Warwick in 1983 and the D.Phil. degree from the University of Oxford in 1986. He was an L. E. Dickson Instructor at the University of Chicago Department of Mathematics from 1986 to 1988. He joined the Mathematics Department of the University of Florida in 1989 and is now a Professor there. His research interests include the geometry and representation theory of finite and algebraic groups and their connections with combinatorics and algebraic coding theory.