2004-2005

MATHEMATICS COLLOQUIUM SERIES

03/01/05 Colloquium

Prof. Zixia Song
Ohio State University

will speak on:

Extremal Functions for Contractions of Graphs

A graph H is a minor of a graph G if H can be obtained from a subgraph of G by contracting edges. One of the central problems in Graph Theory is Hadwiger's conjecture, which states that for every integer t>0, every loopless graph with no K_t minor is (t-1)-colorable (K_t denotes the complete graph on t vertices). For t>4, Hadwiger's conjecture implies the Four-Color Theorem. The cases t=5,6 are, in fact, equivalent to the Four-Color Theorem, but Hadwiger's conjecture is open for all t>6. The above equivalence for t=6 makes use of the following beautiful theorem of Mader: for every integer p=1,2,...,7, a simple graph on n vertices and at least (p-2)n-(p-1)(p-2)/2 +1 edges has a K_p minor. Mader's theorem does not extend to p>7, but Jorgensen characterized all counterexamples for p=8. Seymour and Thomas conjecture that Mader's theorem holds for all p and sufficiently large (p-2)-connected graphs. Jointly with Robin Thomas, we prove that Seymour and Thomas' conjecture is true for p=9 by explicitly describing all counterexamples to Mader's formula. We have also studied counterexamples to Mader's formula for p=10 and believe that our methods can be used to extend Mader's theorem for the case when p=10. In a related work I have established a conjecture of Jakobsen from 1983 concerning the extremal function for the graph K_8 with one edge deleted. I will also mention a recent joint result with K. Kawarabayashi.

Dr. Song received the Ph.D. in Mathematics from Georgia Institute of Technology in June, 2004. Presently, she is a Zassenhaus Assistant Professor at Ohio State University. Her primary research interest is graph theory.

DATE: **Tuesday, March 1, 2005**
TIME: **10:30 – 11:30 AM**
PLACE: **Math and Physics Building, Room 233**