



PURDUE UNIVERSITY

Department of Mathematics Colloquium

Speaker: Professor Patrick Speissegger, McMaster University  
Title: "O-minimal Transition Maps and Roussarie's Finite Cyclicity Conjecture"  
Date: Tuesday, December 1, 2009  
Time: 4:30 P.M.  
Place: MATH 175

**Abstract**

Let  $F$  be the family of all polynomial vector fields of degree  $d$  in the plane. Hilbert's 16th problem conjectures that there is a finite bound on the number of limit cycles of the vector fields belonging to  $F$ . This as yet open problem (if  $d$  is at least 2) has a tantalizingly model-theoretic flavor, but no model-theoretic framework has been discovered so far to capture it. On the other hand, Roussarie's finite cyclicity conjecture reduces the problem to a localized (in the parameter space) one. In recent joint work with Kaiser and Rolin, we used o-minimality (a branch of model theory) to establish Roussarie's conjecture in a very special case. I will survey our approach, with an emphasis on the role o-minimality plays in obtaining a finite upper bound on the number of limit cycles.

Refreshments will be served in the Math Library Lounge at 4:00 p.m.