UNDERGRADUATE SEMINARS

Time: Monday, July 4, 2:30 – 3:30
Location: CW 307.20 (Math Lounge)

Sam Jaques
Intersecting Sets of 2-Transitive Groups

Supervised by Karen Meagher

Abstract:

Two elements g, h of the symmetric group are called "intersecting" if $g(i) = h(i)$ for some i. Given a subgroup of the symmetric group, what are the largest sets such that any two elements in it intersect each other? This question is very similar to the Erdos-Ko-Rado theorem for sets, but for groups things get more complicated. Using graph theory and representation theory I'll show that for 2-transitive groups, the stabilizers of points are maximal intersecting sets. But are there others?

Jesús Miguel Martínez Camerena
Rasiowa-Sirkorski: Back and forth again

Supervised by Shaun Fallat

Abstract:

In set theory and mathematical logic, the technique of forcing is an important and powerful tool. It allow us to generate models for axioms of set theory, such that these models satisfy, or are "forced" to satisfy, some special or desirable properties (e.g. C.H. or its negation), providing a way to proof independence and consistency of this properties. A fundamental part of this technique is the Rasiowa-Sikorski Lemma, that allows us to extend certain known objects, devising a "new" one that both enhances and carries with it some desirable properties.

In spite of its simplicity, it encloses a clever perspective to work with basic set theoretical concepts (such as orders and compatibilty) and combines to obtain strong and amazing results. This Lemma is usually introduced via some heuristic applications in order to better understand its mechanisms. Between others, this result holds important similarities (although slanted ones) with the constructive method of back and forth.

I find this result really beautiful and elegant, and will present both the lemma and some heuristic approaches, as well as a discussion of these concepts in a simple and friendly way.

University of Regina

Mathematics and Statistics