Mathematics Colloquium
Sponsored by The Simple Group

Regularity Properties for Definable Sets of Reals, Infinite Games and Large Cardinals

Mitch Rudominer
Senior Software Engineer
Google

Friday, February 9, 2018
4:10 − 5 p.m.
Building 53 Room 202

Abstract

The Axiom of Choice implies that there are "wild" subsets of $\mathbb{R}$. For example there is a set $A \subset \mathbb{R}$ that is not Lebesgue measurable and there is a set $A \subset \mathbb{R}$ that does not have the property of Baire. Also it is undecidable whether or not there is an uncountable set $A \subset \mathbb{R}$ that is not equinumerous with all of $\mathbb{R}$. (This is the continuum hypothesis question.)

On the other hand "nicely defined" sets are more regular and do not exhibit this wild behavior. For example all Borel sets are Lebesgue measurable, have the Property of Baire, and if they are uncountable then they are equinumerous with all of $\mathbb{R}$. (This last fact follows from the fact that all Borel sets have the perfect set property.)

A natural question to ask is can we extend these regularity properties to sets of reals that are more complicated than Borel sets but are still in some sense "definable"–as opposed to arbitrary sets whose existence is implied by the Axiom of Choice. We will explore answers to this question.

About the speaker: Mitch Rudominer has a Ph.D. from UCLA in logic and set theory (advisor: John Steele), and is currently a senior software engineer at Google in the Bay Area, working on deploying privacy-preserving algorithms for collecting software usage analytics.

Refreshments before the talk will be at 4 p.m.
in the same room as the talk, Building 53 Room 202.