Department of Mathematics and Computer Science

Friday, March 31, 2017, 4:10 pm

COLLOQUIUM TALK

Speaker: Joel Moreira (Northwestern University)

Old Main 2231

Monochromatic sums and products - a brief journey through Ramsey theory

Abstract:

Is it possible to color the natural numbers with finitely many colors, so that whenever x and y are of the same color, their sum $x + y$ has a different color? A 1916 theorem of I. Schur tells us that the answer is **no**. In other words, for any finite coloring of $\mathbb{N}$, there exist x and y such that the triple $\{x, y, x+y\}$ is monochromatic (i.e. has all terms have the same color). A similar result holds if one replaces the sum $x + y$ with the product xy, however, it is still unknown whether one can finitely color the natural numbers in a way that no quadruple $\{x, y, x + y, xy\}$ is monochromatic! A recent partial solution to this problem states that any finite coloring of the natural numbers yields a monochromatic triple $\{x, x + y, xy\}$. In order to present the main ideas underlying this recent progress, I will review some classical results in Ramsey theory and explain how ergodic theory and dynamical systems can be used to answer questions in this field. The talk will be expository and should be accessible to graduate students.

SNACKS IN FACULTY LOUNGE AT 3:30 PM.
EVERYONE WELCOME (EVEN IF YOU ARE UNABLE TO ATTEND THE TALK)