# Ramsey Interest Group
Meeting notes: 10/2/2017

The next meeting will be on Monday, October 16, 2017 at 7:30 pm in 302 Walker.

Item 1: We have discussed guessing colorings to try to improve the lower bounds for finite Ramsey numbers. Are the odds of this working good or awful? We can check for known results. For example, there are $2^{10}$ different 2-colorings of the edges of $K_5$, some of which have no monochromatic triangles ($K_3$). How many of these colorings have no monochromatic triangles? As a percentage of colorings, this would tell us how likely we are to guess at random a coloring showing that $r(3,3) > 5$.

Item 2: Graph theorists write $C_n$ for a cycle with $n$ vertices. For example, a $C_4$ is a square. A $C_3$ is the same as a $K_3$, and $3$ is the only number for which this is true. For future consideration, adjacency matrices can be used to count the paths (and cycles) in graphs.

Item 3: It is possible to find Ramsey numbers for colorings that use more than 2 colors. For example, $r(3,3,3) = 17$, that is, there is a 3-coloring of $K_{16}$ with no monochromatic triangles, but every 3-coloring of $K_{17}$ must contain a monochromatic triangle. For four colors,

$$51 \leq r(3,3,3,3) \leq 62.$$

These Ramsey numbers and many others can be found in Radziszowki's dynamic survey [1].

[1] Stanisław P. Radziszowski, *Small Ramsey numbers*, Electron. J. Combin. **1** (1994), Dynamic Survey 1, 30. http://www.combinatorics.org/ojs/index.php/eljc/article/view/DS1/pdf.