

Sparse Sets in Triangle-Free Graphs

by John Gimbel

This is a talk about Ramsey Theory, a branch of mathematics that is approximately 100 years old. Strictly speaking, it is not really a branch of mathematics, but rather is a part of just about every branch of mathematics. In a slightly over-simplified form, Ramsey Theory tells us that complete disorder is impossible. If given what appears to be a very large and completely chaotic system, one can always find a large part that is, in some way or another, very well organized.

In this presentation, we will discuss some classic results in graph theory along with their proofs. In particular, we will consider triangle-free graphs which have no large independent sets of vertices. Of course, "large" is a relative term. Then we will turn to more contemporary work and discuss triangle-free graphs which have no large sets which contain no vertices of large degree.