Number Theory Seminar

Friday, August 28th, 2020

11:00 am on Zoom

Thomas Bloom

University of Oxford

Arithmetic progressions in dense sets of integers

ABSTRACT

How large can a subset of the integers be if it does not contain any non-trivial arithmetic progressions? This is a classical problem of additive combinatorics, and in a qualitative sense was answered by Roth, who in 1953 showed that such a set must have zero density. In this talk we review the quantitative aspects of this problem, leading up to our recent result (joint with Olof Sisask) that shows in particular that if the sum of reciprocals diverges then the set must contain a non-trivial three-term arithmetic progression, resolving a well-known conjecture of Erdős.

Our goal will be to give a high-level overview of the kind of methods and techniques used, and will eschew technical details and assume no prior knowledge of the area.