ODTU-Bilkent Algebraic Geometry

Arithmetic Progressions in Finite Fields

By

Haydar Göral
(İYTE)

Abstract: In 1927, van der Waerden proved a theorem regarding the existence of arithmetic progressions in any partition of the positive integers with finitely many classes. In 1936, a strengthening of van der Waerden's theorem was conjectured by Erdös and Turan, which states that any subset of positive integers with a positive upper density contains arbitrarily long arithmetic progressions. In 1975, Szemeredi developed his combinatorial method to resolve this conjecture, and the affirmative answer to Erdös and Turan's conjecture is now known as Szemeredi's theorem. As well as in the integers, Szemeredi-type problems have been extensively studied in subsets of finite fields. While much work has been done on the problem of whether subsets of finite fields contain arithmetic progressions, in this talk we concentrate on how many arithmetic progressions we have in certain subsets of finite fields. The technique is based on certain types of Weil estimates. We obtain an asymptotic for the number of k-term arithmetic progressions in squares with a better error term. Moreover our error term is sharp and best possible when k is small, owing to the Sato-Tate conjecture. This work is supported by the Scientific and Technological Research Council of Turkey with the project number 122F027.

Date: 22 March 2024, Friday
Time: 15:40 (GMT+3)
Place: Zoom

To request the event link, please send a message to sertoz@bilkent.edu.tr