Mat 598, Topic: Extremal Graph Theory
Spring 2021

Time: TTh 12:00-1:15
Room: DH A 207
SLN: 16705
Instructor: Andrzej Czygrinow

Extremal graph theory studies problems that seek to characterize graphs that are maximal or minimal with respect to some global parameter and possess certain properties. For example, graphs on n vertices with a maximum number of edges that do not contain a cycle of length k.

In this course, we will discuss many important aspects of the extremal graph theory, including Turán's theorem, Zarankiewicz problem, Erdős-Stone theorem, or some Ramsey-related facts. In addition, we will study some exciting recent developments in the theory. In particular, we will discuss many facets of the regularity method, including quasi-randomness of Gowers, the spectral proof of the Szemerédi's lemma by Tao, or the regularity lemma of Frieze and Kannan.

The course is based on material from a few advanced textbooks and research papers and there is no single book that we will rely on. Grades will be determined entirely on in-class presentations of papers assigned during the course.

The course is directed to graduate students in mathematics and computer science who have interest in graph theory or combinatorics.