NCTS
National Center for Theoretical Sciences

Summer Schools on Combinatorics

Date 10:00-16:00, August 5- August 9, 2024

Venue Room 515, Cosmology Building, NTU

Speakers

Ting-Wei Chao   Massachusetts Institute of Technology

Hung-Hsun Yu   Princeton University

Organizer

Wei-Hsuan Yu   National Central University

Introduction & Purposes

We are happy to have Ting-Wei and Hung-Hsun, two Taiwanese staying is U.S. young and talented mathematicians in the area of Combinatorics to share their professional knowledge to the combinaotircs and graph community in Taiwan.

Outline & Descriptions

In this summer school, we will covers everal topics about the polynomial method and the entropy method.The polynomial method was introduced by Dvir in his elegant solution to the finite field Kakeya problem, which was later adapted by Guth and Katz to solve the joint problem. We will cover the recent progress on the tight bounds on these two problems and some bounds on the variants of the joint problem. Moreover, the joint problems can be viewed as generalizations of some graph-homomorphism counting problems, so the polynomial method can be thought of as a powerful but complicated tool to study graph homomorphisms. The entropy method is a useful tool in extremal combinatorics, especially for graph-homomorphism-counting problems. We will go through the properties of entropy, prove generalizations of H"older's inequality, and theorems about extremal graph theory, including results by Galvin--Tetali and Zhao on number of independent sets, result by Szegedy on Sidorenko's conjecture, and results by Chao--Yu on problems inspired by the joints problem.

Contact **Murphy Yu**   murphyyu@ncts.tw   Registration