Boğaziçi Math Seminar

Problems surrounding the Hadwiger number of graphs topologically

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Abstract:

For a (finite and simple) graph G, its Hadwiger number $had(G)$ is defined to be the largest integer h such that G contains the complete graph K_h as a minor. The most long standing and intriguing conjecture of Hugo Hadwiger (1943) claims that the inequality $\chi(G) \leq had(G)$ holds for every graph G, where $\chi(G)$ denotes the chromatic number. As opposed to the Hadwiger number, the chromatic number of graphs is topologically lower bounded. That brings the question of whether these topological bounds are also valid lower bounds to the Hadwiger number. I hope to address these questions in detail as well as a recent conjectural detection of the Hadwiger number due to Holmsen, Kim and Lee (2019) in terms of the homological dimension of hypergraphs of connected covers. Independent of the later conjecture, I will prove that the Helly number of (simple) hypergraphs can be topologically lower bounded.

Date : Wednesday, Ocotber 15, 2025
Time: 13:30
Place: TB 130, Boğaziçi University