Institut für Diskrete Mathematik

Combinatorics Seminar

Friday 10th June 14:15

Online meeting (Webex)

A unified Erdős-Pósa theorem for cycles in graphs labelled by multiple abelian groups

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Erdős and Pósa proved in 1965 that there is a duality between the maximum size of a packing of cycles and the minimum size of a vertex set hitting all cycles. We therefore say that cycles satisfy the Erdős-Pósa property. However, while odd cycles do not satisfy the Erdős-Pósa property, Reed proved in 1999 an analogue by relaxing packing to half-integral packing, where each vertex is allowed to be contained in at most two such cycles. Moreover, he gave a structural characterisation for when the Erdős-Pósa property for odd cycles fails. We prove a far-reaching generalisation of the theorem of Reed; if the edges of a graph are labelled by finitely many abelian groups, then the cycles whose values avoid a fixed finite set for each abelian group satisfy the half-integral Erdős-Pósa property, and we similarly give a structural characterisation for the failure of the Erdős-Pósa property. A multitude of natural properties of cycles can be encoded in this setting. For example, we show that the cycles of length ℓ modulo m satisfy the half-integral Erdős-Pósa property, and we characterise for which values of ℓ and m these cycles satisfy the Erdős-Pósa property.

This is the work of Pascal Gollin, Kevin Hendrey, Ken-ichi Kawarabayashi, O-joung Kwon, Sang-il Oum, and Youngho Yoo.

Meeting link:

  https://tugraz.webex.com/tugraz/j.php?MTID=m40f85343e56ff5051d731ace1bea82e4

Meeting number: 2731 089 0467

Password: btHRJxCa252

Joshua Erde, Mihyun Kang