Graz University of Technology

Institut für Diskrete Mathematik

Combinatorics Seminar

Friday 17th January 12:30

Online meeting (Webex)

Extremal and probabilistic aspects of graph rigidity

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Combinatorial rigidity theory addresses questions such as: given a structure defined by geometric constraints, what can be inferred about its geometric behaviour based solely on its underlying combinatorial data? Such structures are often modelled as assemblies of rigid rods connected by rotational joints, in which case the underlying combinatorial data is a graph. A typical question in this context is: given such a framework in generic position in R^d, is it rigid? That is, does every continuous motion of the vertices (joints) that preserves the lengths of all edges (rods) necessarily preserve the distances between all pairs of vertices?

In this talk, I will present new sufficient conditions for the rigidity of a framework in R^d based on the notion of rigid partitions - partitions of the underlying graph that satisfy certain connectivity properties. I will outline several broadly applicable conditions for the existence of such partitions and discuss a few applications, including results on the rigidity of (pseudo)random graphs.

If time allows, I will also discuss new - often sharp - sufficient minimum degree conditions for d-dimensional rigidity and mention a related novel result on the pseudoachromatic number of graphs.

The talk is based on joint work with Michael Krivelevich and Alan Lew.

Meeting link:

https://tugraz.webex.com/tugraz/j.php?MTID=m01b0553e547155cca576e9d6e12f2c55

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