Clustered planarity of Trees via Strip-Trees

Date Tuesday, December 2

Time 3 pm

Location 303 Mudd

Abstract:

We prove that testing clustered planarity (c-planarity) is solvable in a polynomial time for flat clustered graphs with three clusters if the underlying abstract graph is a tree. An analogous result was previously known just for cycles. The Hanani–Tutte theorem says that a graph is planar if it can be drawn in the plane so that every pair of edges not sharing a vertex cross an even number of times. We extend our result by proving the variant of the Hanani–Tutte theorem for trees in the corresponding case of c-planarity. A family of counterexamples shows that this result cannot be extended even to cycles of length at least nine, and thus, it is almost the most general variant of the Hanani–Tutte theorem for clustered graphs without assuming further restrictions. The proof of our variant combines a forbidden substructure characterization of recently introduced embedded strip planar clustered graphs with Tucker's characterization of 0–1 matrices with consecutive ones property.