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The Extremal Function of Unions of Triangles

A graph H is a minor of a graph G if H can be obtained from G by deleting vertices and edges and contracting edges. A deep theory of graph minors has been developed by Robertson, Seymour and others. We discuss extremal properties of graphs not containing a particular fixed graph as a minor.

For a graph H , let the extremal function of H be the supremum of $|E(G)|/|V(G)|$ taken over all simple graphs G not containing H as a minor, denoted by $c(H)$. My conjecture that if H be a disjoint union of graphs H_1 and H_2 then $c(H) \leq c(H_1) + c(H_2) + 1$, if true provides a general way to determine $c(H)$ for many disconnected graphs H . This conjecture has been recently "almost settled" by Csoka, Lo, Norin, Wu and Yepremyan, which allowed them to verify a conjecture of Reed and Wood about the value of $c(H)$ when H is the disjoint union of cycles, as a special case.

Further, we discuss the value of $c(H)$ when H is a union of (not necessarily) disjoint triangles, determining the exact value in many cases.