Combinatorics Seminar

On the number of cliques in graphs with forbidden clique minor

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Abstract: Reed and Wood and, independently, Norine, Seymour, Thomas, and Wollan, showed that for each t there is $c(t)$ such that every graph on n vertices with no K_t minor has at most $c(t)n$ cliques. Wood asked in 2007 if $c(t) < c^t$ for some absolute constant c. This problem was recently solved by Lee and Oum. In this paper, we determine the exponential constant. We prove that every graph on n vertices with no K_t minor has at most $3^{2t/3+o(t)}n$ cliques. This bound is tight for $n \geq 4t/3$.

We use the similiar idea to give an upper bound on the number of cliques in an n-vertex graph with no K_t-subdivision. Easy computation will give an upper bound of $2^{3t+o(t)}n$; a more careful examination gives an upper bound of $2^{1.48t+o(t)}n$. We conjecture that the optimal exponential constant is $3^{2/3}$ as in the case of minors.

This is a joint work with Jacob Fox.

4:00 pm Monday, November 28, 2016
MSC W301

Mathematics and Computer Science
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