Semiconsistent rankings of objects and the Erdos-Hajnal Conjecture

Date Tuesday, February 11

Time 3 pm

Location 303 Mudd

Abstract: The Erdos-Hajnal Conjecture is one of the most challenging open problems in Ramsey graph theory. It says that for every tournament H there exists $\epsilon(H) > 0$ such that every H-free n-vertex tournament contains a transitive subtournament of order at least $n^{\epsilon(H)}$. We call $\epsilon(H)$ *the Erdos-Hajnal coefficient* of H. If the Conjecture is not true then the smallest counterexample is a prime tournament. For a long time the Conjecture was known only for some prime tournaments on at most five vertices. Some time ago it has been proven for infinite families of prime tournaments. However lower bounds for the EH coefficients obtained for them were extremely small (inversely proportional to the Szemeredi tower function). On the other hand, the best upper bounds were of the order $\frac{1}{|H|}$. Recently the speaker proved that there exists $C > 0$ such that all prime tournaments H for which the Conjecture has been proven so far satisfy $\epsilon(H) >= \frac{C}{|H|^5}$. This significantly reduces the gap between lower and upper bounds on EH coefficient for prime tournaments. It also makes the Conjecture applicable. We will describe in this talk several new techniques used recently to better understand EH coefficients of tournaments. Furthermore we will show how related mathematical methods can be used for semiconsistent rankings of objects. Finally we will give some new results regarding excluding a tournament and its complement.