ETERNAL EVICTION AND INDEPENDENCE[1]

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Graph protection involves the deployment of mobile guards on the vertices of a graph. The various protection models can be described as two-player games, alternating between a defender and an attacker: the defender chooses the original positions of the guards, as well as the responses to the attacker, and the attacker chooses the locations of the attacks; we say the attacker attacks the vertices. In the (eternal) eviction game, at most one guard is located at each vertex, and each configuration of guards is a dominating set of the graph. The attacker attacks a vertex occupied by a guard, provided this vertex has at least one unoccupied neighbour. The defender moves the guard to an unoccupied neighbour; only one guard is allowed to move in response to an attack. The defender wins the game if they can successfully defend any sequence of attacks, including sequences that are infinitely long; the attacker wins otherwise. In other words, the attacker's goal is to force the defender into a configuration of guards that is not dominating. The smallest number of guards that can defend a graph G against any sequence of attacks is called the eviction number of G, denoted by $e^{\infty}(G)$. The eviction game was introduced by Klostermeyer, Lawrence, and MacGillivray in 2016.

In this presentation I will demonstrate that the eviction number behaves different from other domination parameters. This anomaly causes problems when we try to prove results for $e^{\infty}(G)$. I will illustrate this by discussing a proof of an upper bound for $e^{\infty}(G)$ in terms of $\alpha(G)$, the independence number of G.

[1] Joint work with Gary MacGillivray and Virgélot Virgile