Binding independence and domination with annihilation and sub-domination

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Abstract

Independence and *domination* are two of the most heavily studied and widely applied concepts in graph theory. For example, independence and its associated graph invariant, the *independence number*, arise in the study of *social cohesion* in social networks, whereas domination and its associated graph invariant, the *domination number*, arise in the *facility location problem* (and many chess puzzles too!). However, computation of these graph invariants is notoriously difficult as their respective decision problems are known to be NP-complete. In this talk we discuss a strategy which uses the degree sequence of the graph and produces computationally efficient lower and upper bounds on both the independence number and the domination number. In particular, we will explore the degree sequence derived invariants known as the *annihilation number*, the *slater number*, the *sub-k-domination number*, and the *sub-total domination number*.

Keywords: Degree sequence; annihilation number, independence number, domination number, total domination, sub-total domination

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