Some Codes for Variants in Graphs

Authors : Sofia Ait Bouazza

Abstract : We consider the problem of finding a minimum identifying code in a graph. This problem was initially introduced in 1998 and has been since fundamentally connected to a wide range of applications (fault diagnosis, location detection ...). Suppose we have a building into which we need to place fire alarms. Suppose each alarm is designed so that it can detect any fire that starts either in the room in which it is located or in any room that shares a doorway with the room. We want to detect any fire that may occur or use the alarms which are sounding to not only to not only detect any fire but be able to tell exactly where the fire is located in the building. For reasons of cost, we want to use as few alarms as necessary. The first problem involves finding a minimum domination set of a graph. If the alarms are three state alarms capable of distinguishing between a fire in the same room as the alarm and a fire in an adjacent room, we are trying to find a minimum locating domination set. If the alarms are two state alarms that can only sound if there is a fire somewhere nearby, we are looking for a differentiating domination set of a graph. These three areas are the subject of much active research; we primarily focus on the third problem. An identifying code of a graph G is a dominating set C such that every vertex x of G is distinguished from other vertices by the set of vertices in C that are at distance at most $r \geq 1$ from x. When only vertices out of the code are asked to be identified, we get the related concept of a locating dominating set. The problem of finding an identifying code (resp a locating dominating code) of minimum size is a NP-hard problem, even when the input graph belongs to a number of specific graph classes. Therefore, we study this problem in some restricted classes of undirected graphs like split graph, line graph and path in a directed graph. Then we present some results on the identifying code by giving an exact value of upper total locating domination and a total 2-identifying code in directed and undirected graph. Moreover we determine exact values of locating dominating code and edge identifying code of thin headless spider and locating dominating code of complete suns.

Keywords : identiying codes, locating dominating set, split graphs, thin headless spider

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