

We study price competition among primaries in a Cognitive Radio Network (CRN) with multiple primaries and secondaries located in a large region. In every slot, each primary has unused bandwidth with some probability, which may be different for different primaries. Also, there may be a random number of secondaries. A primary can lease out its unused bandwidth to a secondary in exchange for a fee. Each primary tries to attract secondaries by setting a lower price for its bandwidth than the other primaries. Radio spectrum has the distinctive feature that transmissions at neighboring locations on the same channel interfere with each other, whereas the same channel can be used at far-off locations without mutual interference. So in the above price competition scenario, each primary must jointly select a set of mutually non-interfering locations within the region (which corresponds to an independent set in the conflict graph representing the region) at which to offer bandwidth and the price at each location. In this paper, we analyze this price competition scenario as a game and seek a Nash Equilibrium (NE). For the game at a single location, we explicitly compute a NE and prove its uniqueness. Also, for the game at multiple locations, we identify a class of conflict graphs, which we refer to as mean valid graphs, such that the conflict graphs of a large number of topologies that commonly arise in practice are mean valid. We explicitly compute a NE in mean valid graphs and show that it is unique in the class of NE with symmetric independent set selection strategies of the primaries.