

SPECTRUM ALLOCATION GAMES UNDER BUDGET CONSTRAINTS

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ABSTRACT

We study bandwidth allocation at base stations of a wireless network as a non-cooperative game between different wireless hosts. A host demands bandwidth from different base stations by submitting bids. Once the bidding is finished, a base station distributes its bandwidth to hosts in proportion to the bids. Hosts are assumed to be budget constrained and price anticipating. We show the uniqueness of this bandwidth allocation scheme when a every host can access every base station. We show that each user gets an overall bandwidth proportional to its wealth at Nash equilibrium. We also briefly investigate the convergence properties of a greedy algorithm for this case. We then consider a more general case when a base station may not be accessible to all the users due to physical barriers. We provide an example to show that Nash Equilibrium point may not be max-min fairness in general for this case. We however show that if we increase the number of users, then the Nash Equilibrium rates are arbitrarily close to the max-min fair rates.