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Iterative Group Splitting Algorithm for Opportunistic Scheduling Systems

Abstract:

An efficient feedback algorithm for opportunistic scheduling systems based on iterative group splitting is proposed in this paper. Similar to the opportunistic splitting algorithm, the proposed algorithm adjusts (or lowers) the feedback threshold during a guard period if no user sends a feedback. However, when a feedback collision occurs at any point of time, the proposed algorithm no longer updates the threshold but narrows down the user search space by dividing the users into multiple groups iteratively, whereas the opportunistic splitting algorithm keeps adjusting the threshold until a single user is found. Since the threshold is only updated when no user sends a feedback, it is shown that the proposed algorithm significantly alleviates the signaling overhead for the threshold distribution to the users by the scheduler. More importantly, the proposed algorithm requires a less number of mini-slots than the opportunistic splitting algorithm to make a user selection with a given level of scheduling outage probability or provides a higher ergodic capacity given a certain number of mini-slots.