On the Performance of Heuristics for Broadcast Scheduling in Ad-Hoc TDMA Networks

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In the Broadcast Scheduling Problem (BSP), a finite set of stations are to be scheduled in a time division multiple access (TDMA) frame. In a TDMA frame, time is divided into slots of equal length. Messages from the stations are transmitted within these slots. However, unconstrained message transmission can result in a collision of messages, rendering them useless. Therefore, the objective of the BSP is to provide a collision-free broadcast schedule which minimizes the total frame length and maximizes the slot utilization within the frame. Such a schedule will minimize the overall system delay.

In this talk, we present the BSP as a NP-Hard combinatorial problem and compare the performance of several heuristics for the problem. These algorithms include sequential vertex coloring, mean field annealing, a mixed neural-genetic algorithm, and GRASP which was implemented by the current authors. We discuss applications and report numerical results from tests on over 60 networks of varying size and densities.

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