Finding Approximate Solutions for the Cooperative Communication Problem in Ad Hoc Networks

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Abstract

We consider the problem of maximizing the total connectivity for a set or wireless agents in a mobile ad hoc network. That is, given a set of wireless units each having a start point and a destination point, our goal is to determine a set of routes for the units which maximizes the overall connection time between them. Known as the *cooperative communication problem in mobile ad hoc networks* (CCPM), this problem has several military applications including coordination of rescue groups, unmanned air vehicles, and geographical exploration and target recognition. The CCPM is known to be NP-hard, therefore we look for efficient heuristics to provide high quality solutions for real world instances. In this work, we propose a metaheuristic based on Greedy Randomized Adaptive Search Procedure (GRASP). Numerical results are presented and compared with standard integer programming techniques.

Keywords: Optimization, Cooperative Control, Ad Hoc Networks, GRASP, Integer Programming

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