Abstract

Abstract of Thesis presented to UFF as a partial fulfillment of the requirements for the degree of Master of Science (M.Sc.)

Heuristics for the Minimum Power Broadcast Problem in Wireless Sensors Networks
Luana Sabatha de Souza Pereira
August/2006

Advisor: Celso da Cruz Carneiro Ribeiro
Department: Computer Science

The wireless sensor network enviroment presents chalenges to the study of *broadcasting* (one source node broadcasts to all others nodes in the network) problems. Batteries's energy limitation is a critical issue in this enviroment, since nodes are powered by batteries with a limited lifetime.

The Minimum Power Broadcast Problem in Wireless Sensors Networks consists in establishing communication from a source node to all other nodes in ad hoc network in such a way that all the nodes are connected and the total broadcast power is minimized. This work presents wireless sensors networks applications, as well as introduces and evaluates algorithms for tree construction in these networks.

A new heuristic is proposed in this work, combining the characteristics of GRASP and path relinking, to find near-optimal solutions to this problem, that exploits the broadcast nature of the wireless ad hoc communication environment and addresses the need for energy-efficient operation. The proposed algorithm obtains better solutions and is less time consuming than the algorithms found in the literature.