

Doctoral Thesis Defense

Speaker: Edward Maraachlian
Supervisor: Dr. H. Harutyunyan
Examining Committee: Drs. S. Khuller, L. Narayanan, H. Propp, J. Opatrny
Title: Optimal Broadcasting in Treelike Graphs
Date: Thursday, April 15, 2010
Time: 10:30 a.m.
Place: EV 3.309 via videoconference

ABSTRACT

Broadcasting is an information dissemination problem in a connected network, in which one node, called the originator, disseminates a message to all other nodes by placing a series of calls along the communication lines of the network. Once informed, the nodes aid the originator in distributing the message. Finding the broadcast time of a vertex in an arbitrary graph is NP-complete. The problem is solved polynomially only for a few classes of graphs. In this thesis we study the broadcast problem in different classes of graphs which have various similarities to trees. The unicyclic graph is the simplest graph family after trees, it is a connected graph with only one cycle in it. We provide a linear solution for the broadcast problem in unicyclic graphs. We also studied graphs with increasing number of cycles and complexity and provide again polynomial solutions. These graph families are: tree of cycles, necklace graphs, and 2-restricted cactus graphs. We also define the fully connected tree graphs and provide a polynomial solution and use these results to obtain polynomial solution for the broadcast problem in tree of cliques and a constant approximation algorithm for the hierarchical tree cluster networks.