I M B M **istanbul matematiksel bilimler merkezi**
istanbul center for mathematical sciences

İstanbul Discrete Mathematics Meetings

SWITCHING COST IN OPTICAL NETWORKS AND TRAFFIC GROOMING

Mordo Shalom

Tel Hai Academic College, Israel

Abstract

Data transmitted in optical fibers is divided into wavelengths, each of which providing a high bandwidth. A typical user needs only a small fraction $(1/g)$ of this bandwith or a multiple of it, where g is called the grooming factor. Given a network with existing topology described by a graph (or digraph) and a set of communication requests over these graph, this model leads to interesting coloring problems. We consider coloring problems in which the goal is to minimize some measure of the switching cost of the network. We concentrate of two typical measures:

a) The number of ADM s (i.e. line terminating equipment) in the network

b) The number of regenerators in the network In our work we show the following results:

- An $O(\log g)$ approximation algorithm for the ADM cost, for any fixed g, where the graph is a ring, a bounded degree tree, or a directed tree.

- A 4-approximation algorithm for the regenerator problem. The problem is equivalent to a scheduling problem when the network topology is a path.

When the grooming is given (or equivalently $g = 1$) we analyze a variant of the regenerator optimization problem. We show that it is NP-Hard even under very simple settings.

Date: **Friday, April 2, 2010**
Time: **11:00**
Place: **IMBM Seminar Room, Boğaziçi University**