

# MATH COLLOQUIUM

## Edge Searching

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**Date** : Wednesday, October 21, 2009

**Time** : 14:00

**Place** : TB 250, Boğaziçi Üniversitesi

**Abstract:** Edge searching is a combinatorial game played on graphs. It corresponds to capturing an intruder in a graph with a minimum number of searchers. This minimum is called the search number of the graph. It is a graph invariant that is related to other graph parameters such as chromatic number and pathwidth. In the original game it is assumed that each edge of the graph is cleaned in the same way and initially each edge has equal contamination that can be considered a weight of one. We modify the problem and consider it on graphs with arbitrary positive integer weights assigned to their edges. We first show that for every weighted graph the minimum number of searchers needed for a not-necessarily-monotonic weighted search is enough for a monotonic weighted search, where each edge is cleaned only once and prove the NP-completeness of the problem. We then consider fast searching, that is, a monotone search where no edge is traversed more than once and the searchers are not allowed to jump. We present a linear time algorithm to compute the fast search number of trees. We close with a note on the search number of circulant graphs on cyclic groups of prime order.

**Tea and coffee will be served at 15:00**