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MADALGO seminar by Pooya Davoodi, Aarhus University

Path Minima on Dynamic Weighted Trees

Abstract:

Consider an unrooted tree where every edge has a weight associated with it. Path Minima queries is finding the edge of minimum weight along a path between two given vertices. In the Semigroup, Comparison and RAM models, we propose data structures for the following variants of the problem: 1) the weight of each edge can be changed using an update operation, 2) new leaves can be inserted and deleted to/from the tree. The Dynamic Trees of Sleator and Tarjan (STOC'81) solves the Path Minima problem on a forest of unrooted trees under edge insertion/deletion. There are various results for different variants of the problem, where one or some of the operations are ignored. We also give several simple reductions from different problems to the variants of the Path Minima problem.

Joint work with Gerth Stølting Brodal and Srinivasa Rao Satti