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Bellman–Ford is optimal (for shortest hop-bounded paths)

Speaker

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Abstract

This talk will be about the problem of finding a shortest s-t path using at most h edges in edge-weighted graphs. The Bellman–Ford algorithm solves this problem in O(hm) time, where m is the number of edges. I will show that this running time is optimal, up to subpolynomial factors, under popular fine-grained complexity assumptions. This lower bound can be contrasted with the recent near-linear time algorithm for the negative-weight Single-Source Shortest Paths problem, which is the textbook application of the Bellman-Ford algorithm. This is joint work with Tomasz Kociumaka (MPI Informatics)w

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