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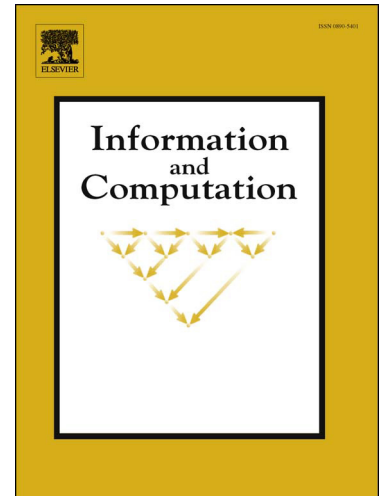
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Dynamic Algorithms via the Primal-Dual Method

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Abstract

We develop a dynamic version of the primal-dual method for optimization problems, and apply it to obtain the following results. (1) For the dynamic set-cover problem, we maintain an $O(f^2)$ -approximately optimal solution in $O(f \cdot \log(m+n))$ amortized update time, where f is the maximum “frequency” of an element, n is the number of sets, and m is the maximum number of elements in the universe at any point in time. (2) For the dynamic b -matching problem, we maintain an $O(1)$ -approximately optimal solution in $O(\log^3 n)$ amortized update time, where n is the number of nodes in the graph.

Keywords: Dynamic Algorithms, Primal-Dual Method, Data Structures

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