Faster Deterministic Fully-Dynamic Graph Connectivity

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Abstract

We give new deterministic bounds for fully-dynamic graph connectivity. Our data structure supports updates (edge insertions/deletions) in $O(\log^2 n/\log\log n)$ amortized time and connectivity queries in $O(\log n/\log\log n)$ worst-case time, where n is the number of vertices of the graph. This improves the deterministic data structures of Holm, de Lichtenberg, and Thorup (STOC 1998, J.ACM 2001) and Thorup (STOC 2000) which both have $O(\log^2 n)$ amortized update time and $O(\log n/\log\log n)$ worst-case query time. Our model of computation is the same as that of Thorup, i.e., a pointer machine with standard AC^0 instructions.

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