A new algorithm efficiently computes the tightest possible resource-level bound for a flexible plan because any tighter bound would exclude the contribution of at least one fixed-time schedule. If the resource-level envelope can be computed efficiently, one could substitute looser bounds that are currently used in the inner cores of constraint-posting scheduling algorithms, with the potential for great improvements in performance.

What is needed to reduce the cost of computation is an algorithm, the measure of complexity of which is no greater than a low-degree polynomial in $N$ (where $N$ is the number of activities). The new algorithm satisfies this need. In this algorithm, the computation of resource-level envelopes is based on a novel combination of (1) the theory of shortest paths in the temporal-constraint network for the flexible plan and (2) the theory of maximum flows for a flow network derived from the temporal and resource constraints. The measure of asymptotic complexity of the algorithm is $O(N \cdot \maxflow(N))$, where $O(x)$ denotes an amount of computing time or a number of arithmetic operations proportional to a number of the order of $x$ and $O(\maxflow(N))$ is the measure of com-