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*Novel Use of Matching That Sometimes Detects Infeasible IPs*

A novel matching-based heuristic algorithm that detects an infeasible  $\{0,1\}$  IP is presented. Input to the algorithm is a set of nested doubly stochastic subsystems and a set of instance defining variables set at zero level. Output from the algorithm is either a certificate of infeasibility, or an undecided IP with a non-empty set of variables deduced to be at zero level. All feasible IPs, and all infeasible IPs that fail to be detected infeasible are undecided. Results of an application to a model of the Hamilton tour decision problem are presented followed by models of both the graph and subgraph isomorphism decision problems. The algorithm is easy to generalize and highly parallel. It's proposed for use in search based algorithms/solvers, in concert with other search techniques.