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A new effective heuristic for the Prisoner transportation problem

The Prisoner Transportation Problem is an NP-hard combinatorial problem and a complex variant of the Dial-a-Ride Problem. Given a set of requests for pick-up and delivery and a homogeneous fleet, it consists of assigning requests to vehicles to serve all requests, respecting the problem constraints such as route duration, capacity, ride time, time windows, multi-compartment assignment of conflicting prisoners and simultaneous services in order to optimize a given objective function.

We present a new solution framework to address this problem that leads to an efficient heuristic. A comparison with computational results from previous papers shows that the heuristic is very competitive for some classes of benchmark instances from the literature and clearly superior in the remaining cases. Finally, suggestions for future studies are presented.

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