



## ***BRANCH AND CUT AND PRICE FOR THE TIME-DEPENDENT VEHICLE ROUTING PROBLEM WITH TIME WINDOWS***

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### **ABSTRACT**

In this paper, we consider the Time-Dependent Vehicle Routing Problem with Time Windows (TDVRPTW). Travel times are time-dependent, meaning that depending on the departure time from a customer a different travel time is incurred. Because of time-dependency, vehicles' dispatch times from the depot are crucial as road congestion might be avoided. Due to its complexity, all existing solutions to TDVRPTW are based on (meta-) heuristics and no exact methods are known for this problem. In this paper, we propose the first exact method to solve TDVRPTW. The MIP formulation is decomposed into a master problem that is solved by means of column generation, and a pricing problem. To insure integrality, the resulting algorithm is embedded in a Branch and Cut framework. We aim to determine the set of routes with the least total travel time. Furthermore, for each vehicle, the best dispatch time from the depot is calculated.