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## Modeling and Optimizing the Professional Driver Training Timetabling Problem

### Communication Info

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### Abstract

Professional drivers transporting goods and passengers must obtain a professional card after completing mandatory training at accredited centers, as stipulated by the Moroccan Road Code 52.05. Designing training timetables that comply with regulatory requirements for both theoretical courses and practical driving sessions is a complex task. This paper introduces the Professional Driver Training Timetabling Problem (PDTTP) [1], a novel real-world combinatorial optimization problem. It shares features with the educational timetabling problem (ETTP) [2], which is generally classified into examination timetabling [3], school timetabling [4], and course timetabling problems (CTTP) [5]. However, the PDTTP introduces new challenges specific to the transportation context. A key issue is that groups assigned to driving practice cannot attend theoretical classes, so equal training time must be guaranteed for all groups sharing the same classroom. Mixed Integer Linear Programming (MILP) models are proposed to optimize the assignment of trainers, classrooms, and vehicles to groups under capacity and regulatory constraints. For large-scale instances, a Simulated Annealing-based heuristic is developed. Computational results show how resources scale with the number of training groups, providing decision-makers with insights to allocate resources efficiently and maximize the number of groups trained.

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