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"The technician routing problem with conventional and electric vehicles"

« This presentation introduces the technician routing problem with conventional and electric vehicles (TRP- CEV), which is inspired by the technician routing problem of ENEDIS. This problem consists in routing a set of technicians to serve a set of customers, using a fleet composed by electric vehicles (EVs) and conventional vehicles (CVs). It considers several real-life constraints such as: time windows of the requests, working schedules and lunch breaks of the technicians, skills incompatibility between technicians and request, incompatibility between charging stations and EVs, autonomy of the EVs, nonlinear charging function, and a limited number of vehicles for each type. Decisions that must be taken simultaneously are the vehicle-to-technician assignment, the route construction, and the battery charging program.

To solve the TRP-CEV we propose a parallel matheuristic (PMa). This approach decomposes the TRP- CEV into a set of VRP-TW and eVRP-TW with lunch break (one for each couple technician-vehicle), and solves each sub-problem in parallel using a greedy randomized adaptive search procedure (GRASP). Later, PMa uses a set covering model to assemble a TRP-CEV solution. We built a set of real instances based on the ENEDIS operation. The aim of these instances is to evaluate the performance of the PMa, and to analyse the features of the solutions under the light of some important metrics for ENEDIS. Finally, we analyze the solutions delivered by PMa for the TRP-CEV aiming to provide some insight about the behaviour of costs, emissions, and visits to CSs for different compositions of the fleet. »