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Modelling of Multi-Agent Systems for the Scheduling of Multi-EV Charging from Power Limited Sources

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Abstract : This paper presents the research and application of model predictive scheduled charging of electric vehicles (EV) subject to limited available power resource. To focus on algorithm and operational characteristics, the EV interface to the source is modelled as a battery state equation during the charging operation. The researched methods allow for the priority scheduling of EV charging in a multi-vehicle regime and when subject to limited source power availability. Priority attribution for each connected EV is described. The validity of the developed methodology is shown through the simulation of different scenarios of charging operation of multiple connected EVs including non-scheduled and scheduled operation with various numbers of vehicles. Performance of the developed algorithms is also reported with the recommendation of the choice of suitable parameters.

Keywords : model predictive control, non-scheduled, power limited sources, scheduled and stop-start battery charging
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