World Academy of Science, Engineering and Technology
International Journal of Transport and Vehicle Engineering
Vol:13, No:09, 2019

Low-Level Modeling for Optimal Train Routing and Scheduling in Busy Railway Stations

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Abstract : This paper studies a train routing and scheduling problem for busy railway stations. Our objective is to allow trains to be routed in dense areas that are reaching saturation. Unlike traditional methods that allocate all resources to setup a route for a train and until the route is freed, our work focuses on the use of resources as trains progress through the railway node. This technique allows a larger number of trains to be routed simultaneously in a railway node and thus reduces their current saturation. To deal with this problem, this study proposes an abstract model and a mixed-integer linear programming formulation to solve it. The applicability of our method is illustrated on a didactic example.

Keywords : busy railway stations, mixed-integer linear programming, offline railway station management, train platforming, train routing, train scheduling
Conference Title : ICRE 2019 : International Conference on Railway Engineering
Conference Location : London, United Kingdom
Conference Dates : September 25-26, 2019