Assessment of Stochastic Capacity Consumption in Railway Networks

The railway industry continuously strive to reduce cost and utilise resources optimally. Thus, there is a demand for tools that are able to fast and efficiently provide decision-makers with solutions that can help them achieve their goals. In strategic planning of capacity, this translates into being able to evaluate capacity considering robustness of the operation efficiently. To achieve this efficiency a timetable should not be needed as input, as producing timetables is very time consuming. In this paper we therefore propose a model to calculate the capacity consumption distribution in networks where a timetable is not needed as input. We account for robustness using a stochastic simulation of delays to obtain the stochastic capacity consumption in a network. The model is used on a case network where four different infrastructure scenarios are considered and both deterministic and stochastic capacity consumption results are obtained efficiently. The case study show that the results of capacity analysis depends on the size of the network considered. Furthermore, we find that the capacity gain in the case scenarios are greater when delays are considered compared to a deterministic setting.