

Fuzzy maximum capacity and occupancy time rate measurements in urban railway lines

A. Fernández Cardador; A.P. Cucala García; L.M. Navarro Rodríguez

Abstract-

Nowadays, railway transport capacity is an important bottleneck for many railway operators that face its ever-increasing demand. This poses a challenge to existing lines as operation under conditions close to saturation tends to be unstable. Capacity in urban railway systems depends largely on dwell times at platforms, but capacity measures proposed in literature rarely include the uncertainty associated to these times. In this paper this uncertainty is modeled as fuzzy numbers and two new capacity measures are proposed: the Fuzzy Maximum Capacity and the Fuzzy Occupancy Time Rate. The proposed model makes use of a railway simulator that enables route compression to obtain the conflict-free compressed time of the section under study. Three practical capacity problems from the perspective of the railway traffic operator have been presented and solved. The new measures provide more information to the railway operator than the standard UIC method that does not include uncertainty regarding dwell times. Finally, the model has been applied to the section Gràcia-Sarrià, belonging to the Spanish railway operator FGC.

Index Terms- Fuzzy; Urban transport; Dwell times; Capacity

Due to copyright restriction we cannot distribute this content on the web. However, clicking on the next link, authors will be able to distribute to you the full version of the paper:

[Request full paper to the authors](#)

If your institution has an electronic subscription to European Transport Research Review, you can download the paper from the journal website:

[Access to the Journal website](#)

Citation:

Cucala, A.P.; Fernández-Cardador, A.; Navarro, L.M. "Fuzzy maximum capacity and occupancy time rate measurements in urban railway lines", European Transport Research Review, vol.10, pp.61-1-61-14, December, 2018.