Incorporating Dynamic Bus Stop Simulation into Static Transit Assignment Models

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Abstract:

This study provides a methodology to incorporate the dynamic bus stop simulation into a proposed static transit assignment model. It tries to combine the merits of the realism of dynamic models and the simplicity of static models in a single framework. An algorithm is developed to simulate any load profile of both passenger and bus arrivals. Then, the simulation results are used within the transit assignment process to allow a better line choice representation. A detailed illustrative example is given to validate the proposed assignment methodology performance. The resulted flows in some cases exceed lines capacity while conserving the static equilibrium principles. This capacity violation interprets the fact that some passengers may fail to board the first incoming bus of their desired line due to insufficient capacity. However, they wait until a vacant space is offered on the same line. In addition, a benchmark problem is solved to ease the comparison between the proposed methodology and the existing methodologies. It shows the methodology capability of incorporating different waiting time models to produce passenger flow on transit lines. It also indicates the importance of lines that might be neglected in other transit assignment models. This would highlight the methodology interpretation of passengers' behavior in transit networks.

Keywords:

Traffic assignment Transit planning Bus stop modeling Simulation

Published In:

Int J Civ Eng, NULL, NULL