Route choice modelling in dynamic traffic assignment

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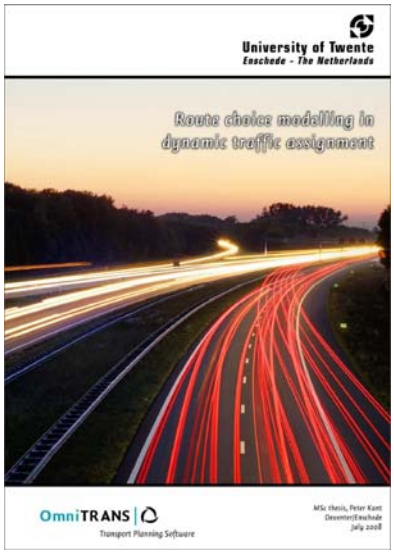

Problem definition
Existing dynamic traffic assignment models become more and more advanced in terms of propagation, but in terms of route choice, many models are still relatively primitive. With the increase of research for route choice models, the question arises if it is possible to extend current dynamic network loading models by improving them by adding route choice. Questions included are which route choice models are good enough for application and how these models should be combined with the propagation model.

Methodology
In recent years, the research on route choice models and –more in general– discrete choice models from Random Utility Maximisation has increased significantly. Many research has been performed from a theoretical point of view. In this thesis the performance of several GEV based models is tested using a Monte Carlo (Probit) simulation technique. For this purpose a large scale network is used out of which 26 zones are selected for routeset generation, filtering and route choice calculation.

Additional research is performed to determine how route choice models and dynamic network loading models have to be combined. A new flexible dynamic equilibrium is presented to replace two existing dynamic equilibria (Boston & Dynamic User Equilibrium). This equilibrium is formulated with the intention to give results closer to realism. A prototype model is developed and tested on a relatively small network.

Results and discussion
There are significant relations between characteristics of routesets and performance of the tested route choice models. This implies that the question which route choice models should be applied depends largely on the type of routeset. In general the PCL model gives relatively good results while not much effort has to be put in calibration.

The prototype model for interaction between route choice and propagation shows results matching expectations. Combining iterations using a method of successive averages leads to fast and stable convergence. If models get more stochastic, the ability to optimise route choice decreases.

Conclusion and recommendations
- It is possible to extend existing propagation models with route choice. The PCL route choice model is a good place to start, although also CNL, PSL and C-Logit give good results, depending on the characteristics of the routeset. If possible it is advised to determine which model to use before application.
- The new equilibrium method using some kind of forecasting is assumed to be very powerful. It gives more flexibility than current instantaneous and dynamic equilibria.

Tests performed with the prototype are promising. However, additional research is needed to determine if the results presented in this report can be generalised to larger cases. Especially the applicability on large scale networks (with congestion) is advised to be investigated. For this purpose, the current prototype can be optimised to a more efficient test application.