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Project ID 246647

**Optimization and its Applications  
in Learning and Industry  
(OptALI)**

IRSES

**Ongoing Deliverable D1.2**

**Public Transport in Auckland –  
Modelling and Predictions**

Start date of the Workpackage: December 2010

Duration: 48 months

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Participants: UGOE  
UNIKL  
DTU  
UOA  
UC

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# Research Seminar

offered by Marc Goerigk (?-UGOE-?)

February–July ? 2012,

in Auckland, New Zealand

Subject: Public Transport in Auckland – Modelling and Predictions

Problem: Operations Research is able to play an important role in improving the reliability and comfort of public transport systems, provided it has exact data available. Collecting such data is a highly non-trivial task that typically calls for sophisticated estimation models to improve the usability of the results.

The goal of this project is to provide such data for the Auckland bus network; i.e., the location of bus stops, the corresponding travel distance matrix, a pool of possible bus lines, and most importantly, an estimation of passenger demand – the so-called *origin-destination* matrix (or OD-matrix in short).

Finding a realistic OD-matrix is not only of high relevance for research, but also for the practitioner, who needs to know where future infrastructure extensions need to be planned.

The proposed research project consisted of 4 phases:

1. Collection of passenger demand models from the literature.
2. Collection of available data for Auckland.
3. Application of the demand models to the Auckland data.
4. Verification and validation of outcome.

Main Results: All problem phases were completed successfully. The most suitable model approach was a four-step model consisting of trip generation, trip distribution, mode choice and route allocation. With special focus

on the high-density area of the Mt Eden Road bus routes we were able to apply this model using real-world population statistics and trip production rates.

We used this model to answer “what-if questions”, and found consistency with what can be expected for simple scenarios. The code was implemented in C, giving transportation planners a tool to estimate future infrastructure demand.

Participants: students and researchers from UOA.

Publication: -