
MASTER'S THESIS

**Adaptive Network Control with Traffic Lights Modeled
in Microscopic Traffic Simulation**

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ABSTRACT

Traffic signal is one of the most important elements in an urban transport system. Facing the increasing demand of urban traffic, adaptive signal control has become an important role in the urban transportation system. Hence, the performance of adaptive urban traffic control (UTC) systems is a key in smoothing traffic flow and its impacts everyone's daily life.

The aim of the master thesis is to investigate traffic flow controlled by both fixed time and adaptive UTC systems. A small network in Singapore will be chosen to model with real traffic counts. Then the local adaptive UTC in Singapore, SCATS will be implemented to the microscopic simulation. This thesis uses VISSIM for network modelling and for the SCATS signal controller implementation. To make comparable results, fixed time control will be modelled in the network as well. According to the literature review, some key measures for effectiveness (MOE) defined by Highway Capacity Manual 2000 are selected to conduct a comparative analysis between fixed time control and SCATS. To get better understanding of SCATS and fixed time control, performance comparisons are done for different aspects, e.g. level of service assessment at individual intersections, average delay and stops are compared at a network level, average volume along links, and average travel time for the main origin-destination pairs. To make a reliable result analysis, this thesis uses statistical methods to compare the simulation results. Some discussions on the SCATS performance are done according to the result analysis. Some advantages and disadvantages of SCATS seen from simulation and result analysis are discussed. Finally, some methods for improving SCATS are given.