



**University
of Victoria**

Graduate Studies

Notice of the Final Oral Examination
for the Degree of Doctor of Philosophy

of

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MS (George Washington University, 2009)
BSc (University of Engineering and Technology, 2006)

“Traffic Modelling for Intelligent Transportation Systems”

Department of Electrical and Computer Engineering

Thursday, April 14, 2016
1:30 P.M.
Engineering and Computer Science Building
Room 468

Supervisory Committee:

Dr. T. Aaron Gulliver, Department of Electrical and Computer Engineering, University of Victoria
(Supervisor)

Dr. Mihai Sima, Department of Electrical and Computer Engineering, UVic (Member)

Dr. Brad Buckham, Department of Mechanical Engineering, UVic (Outside Member)

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Dr. Gregory Blue, Department of History, UVic

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Abstract

In this dissertation, we study macroscopic traffic flow modeling for intelligent transportation systems. Based on the characteristics of traffic flow evolution, and the requirement to realistically predict and ameliorate traffic flow at high traffic regions, we consider traffic flow modeling for intelligent transportation systems. Four major traffic flow modeling issues, that is, accurately predicting the spatial adjustment of traffic density, the traffic behavior on a long infinite road and on a road having egress and ingress to the flow, affect of driver behavior on traffic flow, and the route merit are investigated. The spatial adjustment of traffic density is investigated from velocity adjustment perspective. Then the traffic behavior based on the safe distance and safe time is studied on a long infinite road for a transition and uniform flow. The traffic flow transition behavior is also investigated for egress and ingress to the flow having a regulation value which characterizes the driver response. The variation of regulation value refines the traffic velocity and density distributions according to a slow or aggressive driver response. Further, the influence of driver behavior on traffic flow is studied. The driver behavior includes the physiological and psychological response. In this dissertation, the route merits are also developed to reduce the trip time, improve the pollution and fuel consumption. Performance results of the proposed models are evaluated.