

better understand the performance of the model, we use instances generated based on the real data of a dry bulk terminal. The average time reduction and modified optimality gap show the efficiency of proposed model.

## ■ MB-51

Monday, 10:30-12:00 - Graham Hills GH542, Level 5

### Traffic and Transportation 2

Stream: Traffic and Transportation

Invited session

Chair: Jean François Wounba

#### 1 - Analysis of the mode of operation of traffic lights at an isolated intersection with destined for operation extended systematization vehicles

Anastasiya Shevtsova

Congestion of the road network due to the high growth of car ownership, typical for the period from 2004 to 2014 increases the cost of doing business and lead to reduction of environmental sustainability in the result of air pollution, and poor methods of traffic management. The growth of motorization abuseable step change in the composition of the transport stream, which has a significant effect on all parameters of the road. In most cities of the Russian Federation on roads dominated by cars, which make up 80-90% of the total population of the park. The high demand for this type of rolling stock contributes to the appearance on the market of vehicles of different dimensions, such as mini cars, jeep and intermediate models with different structural features and overall length, and with that they all belong to the same type of cars. When driving in heavy traffic the difference is the overall length will affect the dynamic envelope and, therefore, the bandwidth section of the road network that has not previously been considered and detailed research in this area has not been conducted. The study was established theoretical and practical tools to enhance the functioning of isolated intersections regulated with traffic lights due to the extended classification of passenger cars on the basis of the developed in the thesis of scientific methods, principles, and mathematical algorithms to collect data on isolated intersections and calculation modes of traffic lights.

#### 2 - Designing an interstate transport corridors assessment platform for sub saharan transport corridors

Jean François Wounba, Alassane Balle Ndiaye, Nkeng George Elambo

The globalization of trade has contracted the distances between states using different transport approaches amongst which land transport corridors. The latter can be defined as land roads linking different economic agents and whose objective is to consolidate flow, improve infrastructure and services. Transport corridor has been experienced in different parts of the world. Nowadays, different tools have been designed to diagnose transport corridors' performances in terms of time, cost, flexibility, reliability, and security of the flows passing through the corridor. None of the above tools is designed to assess transport corridors according to their maturity stage of integrating and connecting different States. The contribution of this research is to design a multi-Criteria decision aids platform named Transport Corridor Maturity Integrated Index (TCMII), based on maturity level approaches. TCMII has many advantages; the most important one is to guide the corridor stakeholders' investment decisions by helping them to take into account the transport corridor current stage of development. This aims to minimise the risks associated with the lack of structured interventions, and to prioritise investments on the transport corridor in developing countries. Case studies have been conducted on the main interstate land corridors in Central Africa. That is the intermodal corridor (rail and road) Douala-Ndjamen, roads corridors Douala-Ndjamen and Douala-Bangui.

#### 3 - TEMPUS: an open-source multimodal trip planner

Romain Billot

We present a new open source multimodal trip planner dedicated to researchers (algorithms comparison) and adaptable to any new city. The operational goal of the TEMPUS project ([tempus.ifsttar.fr](http://tempus.ifsttar.fr)) is to increase the quality of the information given to network users through the development and implementation of a comprehensive multimodal

trip planner. TEMPUS features multimodal shortest path algorithms in order to compute the best solution from a point A to a point B. Dynamic travel time estimations are embedded as well as specific methods for multi-modal route algorithms. TEMPUS can perform one-way trip optimisation, modeling of turning movements on the road network, modeling intermodal transfers and sorting solutions according to other criteria (cost, mode transfers). Tempus is an open source C++ framework aimed at offering services to easily develop, test and compare multi-objective and multi-modal itinerary planning algorithms. It is built on a plugin-oriented architecture that enables users to develop their own algorithm of graph traversal. Part of the Tempus' API is exposed in a language-agnostic way through a WPS server. A graphical interface that allows to easily build itinerary requests and configure Tempus plugins has been developed as a Python plugin for Quantum GIS.

## ■ MB-52

Monday, 10:30-12:00 - Graham Hills GH552, Level 5

### Financial Mathematics 2

Stream: Financial Mathematics and OR

Invited session

Chair: Masamitsu Ohnishi

#### 1 - Multiple stopping problem for American type option on geometric random walk

Jun Oishi, Katsunori Ano

We study an optimal multiple stopping problem with American type reward function on geometric random walk, that is, Cox-Ross-Rubinstein market framework. Our approach is a direct study of the optimal value function for the optimal multiple stopping problem. It may be an interesting aspect that this approach does not need the general theory of optimal stopping for Markov processes. We prove that (1) there exists the multiple stopping boundaries which characterize the optimal first, second, third, .... stopping times that is the corresponding first hitting times to each boundaries, (2) these each boundaries are non-decreasing, etc.

#### 2 - Optimal decisions of debt renegotiation, asset sale, and liquidation

Michi Nishihara, Takashi Shibata

This paper considers a situation in which shareholders of a firm in distress have a choice of whether to proceed to liquidation or debt renegotiation at an arbitrary time. We show that a lower volatility and a higher initial coupon increase the shareholders' incentive to choose debt renegotiation to avoid liquidation. When debt renegotiation is optimally chosen, the shareholders decrease the coupon of debt and use equity financing to retire a part of the debt value at the original liquidation time. The shareholders do not prefer partial asset sale in debt renegotiation unless the sale price is higher than the corresponding value of the liquidation case. We also reveal the effects of a high equity financing cost of the firm in distress. A higher equity financing cost reduces the value of debt renegotiation by suppressing the coupon reduction, and then, it increases the shareholders' incentive to liquidate the firm.

#### 3 - Multi-Period Investment Policy for Corporate Pension Fund with Sponsoring Company

Muneki Kawaguchi, Norio Hibiki

We propose an optimization model to obtain multi-period corporate pension investment strategy in consideration of the characteristics of sponsoring company and pension fund, economic condition. We analyze the impact of the optimal investment strategy for the pension fund. We extend a multi-period stochastic programming model to obtain optimal investment strategy from sample paths of business return and asset returns. We describe the characteristics of these returns using a regime switching model. The distributions of the sample paths of these returns depend on economic condition in our model. The information which the investors get about economic condition is expressed as the state probability on the regime switching model. The optimal asset allocation given by our model depends on the state probability. There are two types of views on pension management, short-term view and long-term view. The assumption for economic condition differs between two types of views. The parameters of our model are estimated with financial market data and accounting information on the