AMC Project Advertisement

Title:

Models and Algorithms for Scheduling Ships Through the Navigation Channel at a Tidal Port

Type:

2018 John Bicknell Scholarship

Value & Duration:

The John Bicknell Scholarship is equivalent to a University of Tasmania Elite scholarship (current RTP rate + $7,500 top-up per annum), with additional operational funds of up to $5,000 per annum) for a term of 3 years (with a possible 6 month extension). The scholarship is available to domestic and international applicants, and the awardee must meet or exceed the criteria of a University of Tasmania Elite award. It is awarded on an annual basis, subject to funds being available.

Closing Date:

11:59pm (AEST), Monday 19 March 2018

The Research Project:

This project aims to develop models and algorithms for the optimal scheduling of ships through the navigation channel with time-varying water depths caused by tide conditions, in order to maximize the productivity/profit of the port. This research objective will be achieved by conducting the research in the following two modules:

- **Module 1: mathematical optimization models and algorithms for ship scheduling through the channel**

This module quantifies how much the productivity of the port can be improved through development of mathematical models and algorithms. We will investigate ***the geographical/hydrographical conditions and operational policies of all the main tidal ports in the world, for all types of ships including containerships, bulk carriers and tankers***. The restrictions posed by the numbers of berths and tugs will also be considered. In terms of methodologies, mathematical programming and constraint programming models will be developed. Both general-purpose commercial optimization solvers (CPLEX, Gurobi) and dedicated solution algorithms will be evaluated.

- **Module 2: Auction mechanisms for channel usage**

The port authority could consider auctioning tidal windows and making additional profit through the auction by providing an online auto-auction platform, allowing the ships to iteratively bid for certain tidal windows, preferably based on their sailing schedules.

Eligibility:

The following eligibility criteria apply to this scholarship:

- The scholarship is open to domestic (Australian and New Zealand) and international candidates;
- The degree must be undertaken on a full-time basis;

- Applicants must already have been awarded a First Class Honours degree or hold equivalent qualifications or relevant and substantial research experience in an appropriate sector;
- Applicants must be able to demonstrate strong research and analytical skills.

Candidates from a variety of disciplinary backgrounds are encouraged to apply. Knowledge and skills that will be ranked highly include:

- Computer programming in C++/Java/.Net/Python and Matlab
- Operations research and optimization

Funding:

This scholarship is being funded by the commemorative John Bicknell Scholarship.

Application Process:

Applicants who require more information or are interested in this specific project should first contact the listed Supervisor.

Information and guidance on the application process can be found on the Apply Now website.

Information about scholarships is available on the Scholarships webpage.

More Information:

Please contact Dr Yuquan (Bill) Du (yuquan.du@utas.edu.au) for more information.