

The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Cruise Service Planning Considering Berth Availability and Decreasing Marginal Profit

by

Mr Kai WANG
PhD Student
Department of Logistics and Maritime Studies
The Hong Kong Polytechnic University

Date: 26 April 2017 (Wednesday)
Time: 10:00am-11:00am
Venue: R402, Shirley Chan Building
The Hong Kong Polytechnic University

(Conducted in English)

Abstract:

Cruise shipping uses a cruise ship or a cruise liner to provide cruise passengers with pleasure voyages. The voyages and the onboard activities bring rich experience and benefits for cruise passengers, as well as the shore excursion in ports along the way. For the cruise shipping, different from liner shipping, transportation is not the major purpose, as cruise ships normally pick and return the cruise passengers at the same port, and traverses a service route with some pre-determined ports of call. Over the past two decades, the cruise industry had a dramatic development. In 2014, there were 296 cruise ships for all the cruise lines in the world. With such a massive fleet, the cruise industry generated revenues of 37.1 billion US dollars, and the number of cruise passengers reached 22.04 million in 2014 globally.

This study firstly conducts a review of cruise shipping and the cruise industry. The current industry trends are analyzed showing that this industry is still young and has great potential to boom. The past state-of-the-art research works in the cruise industry are reviewed, which are categorized into four research aspects, i.e., regional analysis, risk management, environmental concerns and cruise shipping. By analogizing from the research problems of the liner shipping and considering the characteristics of the cruise shipping, several research opportunities for the cruise shipping are proposed, which are cruise fleet management, cruise ship deployment, cruise itinerary design, and cruise service planning.

Secondly, a specific research problem is addressed for the cruise shipping, which is a decision problem on planning cruise services for a cruise ship to maximize the total profit during a planning horizon. The service is a sequence of ports that the cruise ship visits. In the decision problem, the constraint about the availability of berths at each port is considered. In reality, if a cruise service is executed by the ship repeatedly for several times, the profit earned by the cruise service in each time decreases gradually. Based on the characteristic, we propose a nonlinear integer programming model with a concave objective function to maximize the profit. To solve the nonlinear model, two linearization methods are developed, one of which takes advantage of the concavity for a tailored linearization. The efficiency of the linearization methods is validated by conducting numerical experiments. Some properties of the problem are also investigated by using the dynamic programming and heuristics.

Bio:

Wang Kai received his B.Mgt in Engineering Management from Shanghai University (2014), and MSc in Supply Chain Management from National University of Singapore (2016), during which he has done some internship or part-time jobs in Atlas Copco, General Motors, and Delta Electronics, respectively. After the graduation from NUS, he also has worked as Teaching Assistant & Research Assistant in Engineering School of Griffith University for six months. He is currently pursuing his Doctor of Philosophy under the supervision of Dr. Hans Wang, sponsored by Hong Kong PhD fellowship Scheme. His interested research areas include cruise shipping, port logistics, maritime transportation and optimization algorithms.

Please email to eunice.yt.wong@polyu.edu.hk for enquiries.

All are welcome!