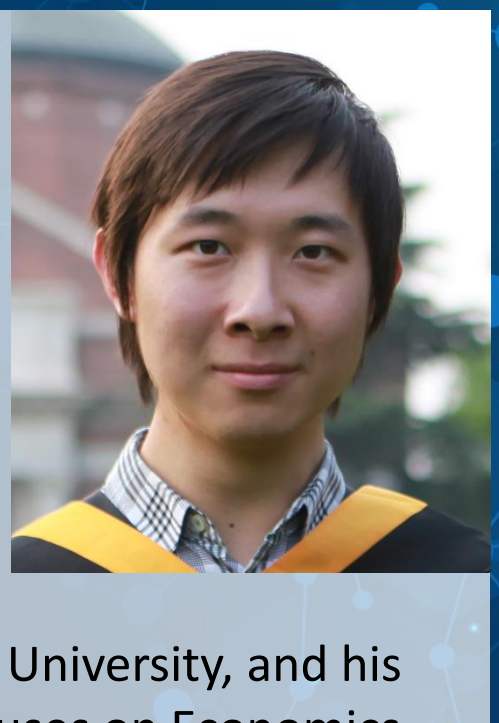
SCHOOL OF COMPUTING & DATA SCIENCE
The University of Hong Kong

Clock Auctions: Allocation-Based Characterisation and Computational Complexity

Date: 19 September, 2024 (Thursday)
Time: 2:00 – 3:00pm
Venue: Room 328, 3/F, Chow Yei Ching Building, The University of Hong Kong



Speaker: Professor Hanrui ZHANG
Assistant Professor in Computer Science and Engineering, The Chinese University of Hong Kong

Biography:
Professor ZHANG did his undergraduate from Tsinghua University, and his PhD from Carnegie Mellon University. His research focuses on Economics and Computation – problems with economic motivations that can be approached using techniques from computer science.

Abstract:
Clock auctions are a natural class of simple auction mechanisms. Clock auctions are known to enjoy strong properties, such as obvious strategyproofness, credibility, and privacy, which offer remarkable robustness in real-world scenarios. In contrast, computational aspects of clock auctions have not been explored as deeply. In this work, we focus on the computational problems of (1) checking whether a given way of allocating items to buyers (i.e., an allocation function) can be implemented by clock auctions, (2) finding a clock auction protocol (whenever there exists one) that implements a given allocation function, and (3) optimising social welfare using clock auctions. We give polynomial-time algorithms for tasks (1) and (2); and show that task (3) is NP-hard. En route, we derive a complete characterisation of the class of allocation functions that can be implemented by clock auctions. We also present a mixed integer programme for task (3), which generally cannot be solve in polynomial time, but nonetheless may prove useful in practice.