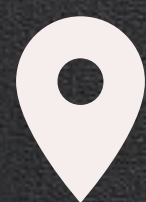




# Mathematics & Mathematics Education Seminar



15 JANUARY 2025 (WED)  
1030 – 1130



MATH JOURNAL ROOM  
NIE7-03-16

## Exploring Students' Mathematical Reasoning in Paper-and-Pencil and Technological Environments: Translation among Environments and Transition across Connected Mathematical Concepts

Mathematical reasoning is an important skill and topic in (lower and upper) secondary mathematics curriculum around the world. With various technologies (either those traditionally perceived to be exclusively for mathematics or those that are not) being used for mathematics education, students' mathematical reasoning approaches within different technological environments and paper-and-pencil environment have also received attentions of researchers. In this seminar, I will present a case study regarding three high school students' reasoning with tasks about (system of) linear inequalities and linear programming, which are mathematics topics that have clear connections, in three environments: paper-and-pencil environment, dynamic geometry environment and text-based programming environment. Data were collected via task-based interviews and recordings of reasoning approaches, and we also analysed the reasoning stages and approaches in different environments with the theory of instrumental genesis. Results showed that students' reasoning approaches were influenced by the epistemic mediation of different environments, showing a certain level of similarities among the three cases; while the analysis of instrumental genesis showed each student's unique features in translation of reasoning approaches among the three environments and transformation from reasoning with (system of) linear inequalities to reasoning with linear programming. I will also give some further discussions on the new insights provided by this study and future directions of research.



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### Speaker's Biography

Dr Jietong Luo is currently a postdoctoral research associate at The Chinese University of Hong Kong. She obtained her PhD in mathematics education at East China Normal University, her Master's degree in pure mathematics at the National University of Singapore, and her Bachelor's degree in mathematics and applied mathematics at Zhejiang University. She has published multiple journal articles in various renowned international journals, including *ZDM - Mathematics Education* and *Journal of Mathematics Teacher Education*; and has also published papers at international conferences such as ICMT, CERME and ICME. Her research interests include language and culture in mathematics education, ICT and computational thinking in mathematics education, mathematics textbook research, mathematics teacher education and professional development.