



Department of  
Systems Engineering

香港城市大學  
City University of Hong Kong

# Stability of first-order methods in tame optimization



**25 October 2023 (Wed) | 10:30 am**

**Dr. Lai Lexiao**

## Seminar Link:

<https://cityu.zoom.us/j/99530413783>

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## Abstract

Lyapunov stability is an important notion for dynamical systems, which has been absent in the optimization literature. When studying optimization methods, the goal has always been proving convergence. However, convergence to critical points could sometimes be unrealistic or undesirable in practice. In this talk, I will introduce the notions of Lyapunov stability for optimization methods. I will then describe my works on characterizing the local and global stability of first-order methods. My results apply to problems arising in data science. In particular, I provide a guarantee of the SGD optimizer for training neural networks.

## About the Speaker

Lexiao Lai is a fifth-year Ph.D. student at Columbia IEOR. His research is in nonconvex optimization, applied semi-algebraic geometry, and data science. Prior to Columbia, he received a Bachelor of Science in Mathematics from the University of Hong Kong.