THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF APPLIED MATHEMATICS
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**The Hong Kong Polytechnic University**
**Department of Applied Mathematics**

**Seminar Series on Young Scholars in Optimization and Data Science**

# Multistability of Small Reaction Networks


**By**

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**Abstract**

The multistability problem of biochemical reaction systems is crucial for understanding basic phenomena such as decision-making process in cellular signaling. Mathematically, it is a challenging real quantifier elimination problem. We present some recent progress on multistability of small reaction networks. 1) For reaction networks with two reactions (possibly reversible), we find the multistable networks those have the minimum numbers of reactants and species. 2) For reaction networks with one-dimensional stoichiometric subspaces, we give the relation between the maximum numbers of stable steady states and steady states. 3）For bi-reaction networks, we completely characterize the bi-reaction networks that admit at least three positive steady states. 4) For zero-one networks, we prove that if a network admits multistationrity, then its rank is at least three.


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**Date: 3 February 2023 (Friday)**
**Time: 15:00-16:00 (Hong Kong Standard Time GMT +8)**
**Venue: Online Talk via Zoom (Meeting ID: 961 2943 2234)**
**Speaker: Prof. Xiaoxian Tang, Beihang University**
**Host: Dr. Xindong Tang, The Hong Kong Polytechnic University**
**Click to join:**
**https://polyu.zoom.us/j/96129432234?pwd=WVNabHhCUTUxcDlLSWdLM1ZMY3g0QT09**

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