



# The Hong Kong Polytechnic University Department of Applied Mathematics

#### **Colloquium Series on Young Scholars in Optimization and Data Science**

## The Multi-Objective Polynomial Optimization

By

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#### Abstract

The multi-objective optimization is to optimize several objective functions over a common feasible set. Since the objectives usually do not share a common optimizer, people often consider (weakly) Pareto points. This paper studies multi-objective optimization problems that are given by polynomial functions. First, we study the geometry for (weakly) Pareto values and represent Pareto front as the boundary of a convex set. Linear scalarization problems (LSPs) and Chebyshev scalarization problems (CSPs) are typical approaches for getting (weakly) Pareto points. For LSPs, we show how to use tight relaxations to solve them, how to detect existence or nonexistence of proper weights. For CSPs, we show how to solve them by moment relaxations. Moreover, we show how to check if a given point is a (weakly) Pareto point or not and how to detect existence or nonexistence of (weakly) Pareto points. We also study how to detect unboundedness of polynomial optimization, which is used to detect nonexistence of proper weights or (weakly) Pareto points.



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Date: 1 April 2022 (Friday) Time: 10:00-11:00 (Hong Kong Standard Time GMT +8) Venue: Online Talk via Zoom (Meeting ID: 929 3032 4361) Speaker: Dr. Zi Yang, University of California, Santa Barbara Host: Dr. Xindong Tang, The Hong Kong Polytechnic University Click to join: https://polyu.zoom.us/i/92930324361?pwd=UEO3bmtodVZmMm1N

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For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 31 March 2022