YU XINRUI (Catherine)

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EDUCATION

The Chinese University Of Hong Kong (CUHK) 09/2016-07/2020

- Bachelor of Mathematics (Major Upper GPA: 3.71/4.0, first honor class, top 5%)
  Enrichment Stream and Computational and Applied Mathematics Stream (ESM & CAM)
- First year in Engineering department ELITE Class with Major GPA 4.0 and transfer to Math department in the second year

Cambridge University, Pembroke and King's college Program 06/2018-08/2018

- Taking course on Material Science, Lego Game design, advanced micro economics in summer school.

Tsinghua University, Yao Class (Program held by CUHK Engineering Department, Elite Class) 06/2017-08/2017

- Taking course on Game Theory, Algorithm analysis, Physics.

AWARDS

1978 Mathematics Alumus Li Sze-lim Scholarship (25,000 HK$) 10/2019

Dean's list in CUHK Science Department (top 10%) 2016-2018.2019-2020

Mathematics Undergraduate Scholarship 11/2018

Bronze Medal in the Chinese Mathematics Olympiad (CMO) 11/2015

RESEARCH AND PROJECT EXPERIENCE

Summer Research on "Sensitivity Analysis and Inverse Problem", University of California, Riverside.

Advisors: Raymond Yat tin Chow and Weitao Chen 6/2019-10/2019

- Strawberry model analysis and inverse problem: Analyzed the local sensitivity and global sensitivity of the main parameters on influencing the model's growth time by EFAST and PRCC method in Matlab. Built the inverse problem to analyze the robustness of the model and find other parameters which show higher stability by random permutation for cyclic descent method. Use timepoint and phytohormone dimensional shift to construct the loss function and adjust the regularization by output patterns.

Final Year Project: Topic in Differential Geometry, The Chinese University of Hong Kong

Advisor: Tom Wan Yau Heng 09/2019-11/2019

- Studied about differential forms application in differential geometry and delivered weekly presentation.

Student Helper: Optimal Auction design, Economics Department, CUHK Advisor: Wei He 02/2020-04/2020

Auction analysis: Adopted Myerson's second-price auction mechanism, worked out the pair distribution of the seller's reserve price and the bidders' bids, which can maximize the seller's revenue under any distribution of the bidders. Got the numerical results when the bidders' bids are set in four and five points in a set.

Research Assistant: Optimization algorithm, CUHK, So Man Cho Anthony 09/2020-Present

- Algorithm Design: Formulate the Pari-mutuel Derivative Call Auction (PDCA) mechanism in horse races under the condition that the Merged pool of bet types with first 2 (ordered) and first 3 (both ordered (TCE) and unordered (TRI)) finish positions and then solve the developed model by CVX in Maltab. Investigate in a faster and more stable solver for the system.
- Sparse optimization: signal recovery under the case of ℓ_0 sparse approximation with ℓ_2 data misfit measure.
- Self-study: manifold optimization on smooth manifold.

EXTRACURRICULAR ACTIVITIES

- Member of CUHK WZQ Organization of building bridges held by I-Care, CUHK 10/2017-08/2018
- CUHK Mainland Graduation Forum 02/2017-08/2017
- One of the organizers of Tsinghua University Volunteer Corps 07/2017

ADDITIONAL INFORMATION

- **Language:** Mandarin (native), English (fluent), Cantonese (Elementary)
- **Computer:** Matlab, R, Python,SQL C, C++ ,Latex, Linux