

The Hong Kong University of Science and Technology

Department of Mathematics

MPhil THESIS EXAMINATION

Computational Optimal Transport Approach to Solving Reflector Design Problem

By

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<u>ABSTRACT</u>

In this seminar, we would summarize and discuss some concepts in Optimal Transport(OT) from theoretical and practical aspects. First, we are going to introduce the original OT problem formulated by French geometer Gaspard Monge. Then we will consider the Kantorovich Relaxation to Monge's problem, since the original problem is so strict. After introducing the relaxation, Kantorovitch's dual framework could be applied to OT, which will be transformed into a standard linear programming problem. Hence solvers can be designed. Some well-known results, like Brenier theory will also be discussed. Later on semi-discrete OT and spherical OT will be included. Since the essence of OT is to find the most economic way to transform one probability distribution to the other, it turned out to be a very powerful tool in various fields, such as computer graphics, medical imaging, computer vision, machine learning, etc. In our context, we will apply OT to inverse problem as an application. To be more specific, the reflector design problem will be elegantly solved using spherical OT approach.

| Date | : | 06 Aug 2020, Thursday |
|------------------------------------|---|--|
| Time | • | 2:30 p.m. |
| ZOOM Meeting | • | https://hkust.zoom.com.cn/j/93120546046 |
| Thesis Examination Committee | : | Prof. Shing Yu LEUNG (Chairman) Prof. Tsz Ho FONG (Supervisor) Prof. Hai ZHANG |

(Open to all faculty and students)

The student's thesis is now being displayed on the reception counter in the General Administration Office (Room 3461).