



**The Hong Kong University of Science and Technology**

**Department of Mathematics**

**MPhil THESIS EXAMINATION**

**A Multilayer Level Set Method with an Application to  
Schrödinger Inverse Source Problems**

*By*

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**ABSTRACT**

The level set method is a numerical approach for interface computation that is widely applied in various fields such as interface modeling, image processing, and inverse problems. The original method represents the interface implicitly by considering the zero level set of a level set function. However, when dealing with multiple interfaces, the original method requires more than one level set function for computations. To address this issue, this thesis introduces a multilayer level set method that extends the original method. This new method enables the representation of multiple interfaces that are subject to different motion laws using a single level set function. This provides a more compact way to express complex geometries for computation. Numerical examples are given to illustrate the application of the multilayer level set method in general interface motion problems and Schrödinger inverse source problems.

**Date : 14 July 2023, Friday**

**Time : 2:00 p.m.**

**Venue : Room 4475 (Lifts 25/26)**

**Thesis Examination Committee**

**Chairman : Prof. Yang XIANG, MATH /HKUST**

**Thesis Supervisor : Prof. Shing Yu LEUNG, MATH/HKUST**

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*(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).