The Hong Kong University of Science and Technology

Department of Mathematics

MPhil THESIS EXAMINATION

Combinatorics of symmetric functions in Hilbert schemes of points on the complex plane

By

Mr. Hiu Chi SIT

ABSTRACT

This thesis focuses on the action of Chern character operators on power-sum functions, specifically in the context of the Hilbert scheme of points. This moduli space parameterizes zero-dimensional subschemes of length n over the Complex plane and has been extensively studied in Algebraic Geometry and Mathematical Physics.

Building on Nakajima's discovery of a set of linear maps of equivariant cohomological classes that satisfy the Heisenberg relations, this thesis explores the recent developments in the connection between the geometry of Hilbert schemes of points and the combinatorics of symmetric functions.

To provide necessary background for this study, the thesis begins with a review of symmetric functions and past results on both the equivariant and non-equivariant setup. From there, the thesis proceeds to present new calculations and insights into the interaction between these mathematical concepts.

Date : 10 April 2024, Wednesday

Time : 11:00 a.m.

Venue : Room 2463 (Lifts 25/26)

Thesis Examination Committee

Chairman	**:**	**Prof. Eric Paul MARBERG, MATH /HKUST**
Thesis Supervisor	**:**	**Prof. Weiping LI, MATH/HKUST**
Member	**:**	**Prof. Huai-Liang CHANG, MATH/HKUST**

(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).