



The Hong Kong University of Science and Technology

Department of Mathematics

MPhil THESIS EXAMINATION

**On the Semi-infinite Cohomology and Categorification
of the Boson-Fermion Correspondence**

By

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ABSTRACT

In this thesis, we first examine the algebraic setting for the semi-infinite cohomology of a Lie algebra and then discuss the realization of semi-infinite cohomology by means of quantum groups. Next, we introduce the original boson-fermion correspondence and its categorification introduced by Frenkel, Penkov and Serganova. We then use the construction to categorify the Weyl algebra and Clifford algebra and their corresponding vertex operator algebra identities. Finally, we suggest possible future directions for these two topics.

Date : 9 August 2023, Wednesday

Time : 2:00 p.m.

Venue : Room 4472 (Lifts 25/26)

Thesis Examination Committee

Chairman : Prof. Yongchang ZHU, MATH /HKUST

Thesis Supervisor : Prof. Ivan Chi Ho IP, MATH/HKUST

Member : Prof. Quoc HO, 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).