# The Hong Kong University of Science and Technology

# Department of Mathematics

# MPhil  THESIS  EXAMINATION

## *On the combinatorics of cluster realization of quantum groups*

### *By*

# Mr. Chun Wai WONG

### *ABSTRACT*

In this thesis, we proved that in the embedding of the Drinfeld double $\mathfrak{D}_{\mathfrak{sl}_n}$ to the quantum torus algebra $\mathcal{D}_{\mathfrak{g}}$, we have certain subsets of vertices such that the embedding of the rescaled Chevalley generators $\boldsymbol{e}_i$ of the Drinfeld double remains polynomial under mutations at those vertices. We also included a quantum analogue of the Lusztig coordinates of different reduced words when the semisimple Lie algebra is of type $A_3$.

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| **Date:** | **10 August 2021, Tuesday** | |
| **Time:** | **10:30 a.m.** | |
| **Venue:** | **Online via Zoom** | |
| | **https://hkust.zoom.us/j/6802683719** (Passcode: 123456) | |

*Thesis Examination Committee*

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| **Chairman** | : | **Prof. Yongchang ZHU, MATH /HKUST** |
| **Thesis Supervisor** | : | **Prof. Ivan Chi Ho IP, MATH/HKUST** |
| **Member** | : | **Prof. Eric Paul MARBERG, 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).**