The Hong Kong University of Science and Technology

Department of Mathematics

<u>PhD THESIS EXAMINATION</u>

Gelfand W-graphs and perfect models

By

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ABSTRACT

A Gelfand model for an algebra is a module isomorphic to a direct sum of irreducible modules, with every isomorphism class of irreducible modules represented exactly once. We introduce and study the notion of a perfect model for a finite Coxeter group; such a model is a certain set of discrete data parametrizing a Gelfand model for the associated Iwahori-Hecke algebra. We classify which Coxeter groups have perfect models, and then describe explicit Gelfand models for the Iwahori-Hecke algebras of classical finite Coxeter groups. Our Gelfand models have interesting "canonical bases" that give rise to associated W-graphs, which we call Gelfand W-graphs. A W-graph is a kind of directed graph encoding an Iwahori-Hecke algebra module. For types B and D, we prove that these W-graphs are dual to each other. For type A, we classify the molecules in our Gelfand W-graphs, and conjecture that in type A every molecule is a cell.

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Time :	**2:00 p.m.**
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The student's thesis is now being displayed on the reception counter in the General Administration Office (Room 3461).