



The Hong Kong University of Science and Technology
Department of Mathematics

PHD THESIS EXAMINATION

Orbits in the affine flag variety of type A

By

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ABSTRACT

It is a classical result that the set $K\backslash G/B$ is finite, where G is a reductive algebraic group over an algebraically closed field with characteristic not equal to two, B is a Borel subgroup of G , and $K = G^\theta$ is the fixed point subgroup of a holomorphic involution of G . In this thesis, we investigate the affine counterpart of the aforementioned set, where G is the general linear group over formal Laurent series, B is an Iwahori subgroup of G , and K is either the orthogonal group or the symplectic group over formal Laurent series, or $GL_p(C((t))) \times GL_q(C((t)))$. We construct explicit bijections between the double cosets and certain twisted affine involutions, or certain signed affine involutions known as affine clans. Since $K\backslash G/B$ can also be interpreted as the K -orbits on the affine flag variety, combinatorial descriptions of double cosets in $K\backslash G/B$ or orbits on the affine flag variety pave the way for exploring affine versions of previously investigated topics in the finite case. For example, the results here will make it possible in future work to study the weak order of the closure of orbits and certain cohomologies of the affine flag variety.

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Time : 10:00 am

Venue : Room 4504 (Lifts 25/26)

Thesis Examination Committee:

Chairman : Prof. Yusong GUO, LIFS/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).