UNIVERSITY of WISCONSIN
UWMILWAUKEE
Department of Mathematical Sciences

Master's Thesis Defense

Mr. Janik Huth

MS Graduate Student

Under the Supervision of Dr. Allen Bell

Tuesday, Apr 14, 2020 at 2:00 pm

Online via Blackboard Collaborate

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The Fundamental System of Units for Cubic Number Fields

Let K be a number field of degree n. An element alpha in K is called integral, if the minimal polynomial of alpha has integer coefficients. The set of all integral elements of K is denoted by O_K . We will prove several properties of this set, e.g. that O_K is a ring and that it has an integral basis. By using a fundamental theorem from algebraic number theory, Dirichlet's Unit Theorem, we can study the unit group O_K*, defined as the set of all invertible elements of O_K. We will prove Dirichlet's Unit Theorem and look at unit groups for the special case of cubic number fields of type (1,1). The structure of the unit group allows us to define a fundamental unit for this type of field. We will study the relation between the discriminant of the number field and this fundamental unit.

Committee Members:
Profs. Allen Bell (Advisor); Jeb Willenbring & Yi Ming Zou

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