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Ernst Kani* (kani@mast.queensu.ca), Department of Mathematics and Statistics, Queen's University, Kingston, Ontario K7L 3N6, Canada. *A Galois theory for elliptic subfields of a genus 2 function field*. Preliminary report.

The purpose of this talk is to explain a correspondence between (maximal) elliptic subfields of a function field $F = K(C)$ of a genus 2 curve C and (certain) representation numbers of the associated “generalized Humbert invariant” q_C , which is a positive definite (integral) quadratic form.

In my talk I will focus particularly on the case that the Jacobian of C is isomorphic to $E \times E'$, where E and E' are isogenous elliptic curves (without CM). In that case q_C is a binary quadratic form in the principal genus, and it turns out that every such quadratic form (except the norm form) arises from some curve C . This leads to:

- (i) a classification of all curves C with the property that J_C is isomorphic to $E \times E'$ and
- (ii) the construction of function fields F with a given elliptic subfield structure.

Finally, I would like to explain the connection (due to Diem and Frey) between elliptic subfields of F/K and families of unramified Galois extensions of F which are regular over K , where K is a function field over a finite field. (Received February 21, 2006)