
Humbert singular relations and linear modular embeddings of modular and Shimura curves

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Résumé

Humbert singular relations are quadratic relations involving the coefficients of the period matrix of a principally polarized abelian surface (ppas), which inform on the existence of both real multiplications in the ring of symmetric endomorphisms and isogenies to products of elliptic curves. Ppas with quaternionic multiplication admit infinitely many real multiplications, which are encoded by a positive definite binary quadratic form, the refined Humbert invariant. We present the pertinent results (on the complex setting) of Kani, Lin-Yang, Guo-Yang, Hashimoto and Rotger, and apply them to study linear relations of coefficients of the period matrix.

In particular, we present modular embeddings for modular curves generalizing the standard diagonal embedding, in the sense that the period matrix has a particularly simple expression.

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