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The arithmetic of genus two curves.

Genus 2 curves have been an object of much mathematical interest since eighteenth century and continued interest to date. They have become an important tool in many algorithms in cryptographic applications, such as factoring large numbers, hyperelliptic curve cryptography, etc. Choosing genus 2 curves suitable for such applications is an important step of such algorithms. In existing algorithms often such curves are chosen using equations of moduli spaces of curves with decomposable Jacobians or Humbert surfaces.

In this lecture we will discuss some new developments in the arithmetic of genus two curves and possible further applications. (Received September 15, 2010)