Séminaire de théorie des nombres

Le 19 janvier 2009 à 14h

K3 surfaces and modular forms

Exposé de Matthias Schuett (Københavns Universitet)

Résumé : A classical construction of Shimura associates every Hecke eigenform of weight 2 with rational coefficients to an elliptic curve over $\mathbb{Q}$. The converse statement that every elliptic curve over $\mathbb{Q}$ is modular, is the Taniyama-Shimura-Weil conjecture, proven by Wiles et al.

For higher weight, however, the opposite situation applies : Nowadays we know the modularity for wide classes of varieties, but it is an open problem whether all newforms of fixed weight with rational coefficients can be realised in a single class of varieties.

I will present joint work with N. Elkies that provides the first solution to the geometric realisation problem in higher weight : We show that every newform of weight 3 with rational coefficients is associated to a singular K3 surface over $\mathbb{Q}$.