1070-11-131 **Reinier Broker*** (reinier@math.brown.edu). *Computing modular polynomials.*
The classical modular polynomial Φ_n parametrizes elliptic curves together with a cyclic isogeny of degree n. These polynomials are important in many algorithms using elliptic curves, but their incredibly large size makes it very hard to compute them. In the 1980's, computing Φ_{11} was considered a major computational effort, and at the end of the 1990's the world record was $n = 359$. In this talk, I will present a new algorithm to compute Φ_n that has an almost optimal running time. The algorithm is based on special properties of certain non-maximal orders in imaginary quadratic fields. The algorithm easily handles large values of n, and our new record is $n = 5003$. (Received February 06, 2011)