1060-20-135 **Gilbert Baumslag** and **Benjamin Fine*** (fine@fairfield.edu), Department of Mathematics, Fairfield University, Fairfield, CT 06824, and **Douglas Troeger**. *Adapting Hilbert's Tenth Problem to Group Based Cryptography.*

The determination of the security of a group based cryptosystem most often involves tying the security to a known hard problem. Hilbert's tenth problem asked whether there is an algorithm to decide whether a given integral polynomial in any number of variables has a zero. In 1970 Davis,Putnam,Robinson and Matiyasevich showed that the answer is no. There exists a polynomial, the zeroes of which are aribtrarily large in abolsute value. In this talk we show how to combine the negative solution of Hilbert's tenth problem with certain properties of augmented rings and certain properties of the classical modular group to develop a public key cryptosystem. (Received March 28, 2010)