1077-11-1082 **A Johnston*** (jannaston@gmail.com), 2003 Smith Ave, Baltimore, MD 21209. *Exponential Hensel Lifting.*

Traditional Hensel lifting finds roots for polynomials modulo p^n given its roots modulo p, where p is a prime integer. In other words, given $f(x) \in \mathbb{Z}[x]$, $r_1 \in \mathbb{Z}/(p)$ such that $f(r_1) \equiv 0 \bmod p$, and an integer $n > 1$, Hensel lifting finds $r_n \in \mathbb{Z}/(p^n)$ such that $f(r_n) \equiv 0 \bmod p^n$.

This talk describes an exponential version of Hensel lifting. It details a method for finding discrete logarithms modulo p^n given a discrete log modulo p: Given $\gamma, \sigma \in \mathbb{Z}$, $a_1 \in \mathbb{Z}/(p-1)$ such that $\gamma^{a_1} \equiv \sigma \bmod p$, and an integer $n > 1$, exponential Hensel lifting returns a_n such that $\gamma^{a_n} \equiv \sigma \bmod p^n$. (Received September 16, 2011)