1128-11-65   **Catherine M Hsu*** (`cathyh@uoregon.edu`). *Higher congruences between newforms and Eisenstein series of squarefree level.*

Let $p \geq 3$ be prime. For squarefree level $N > 6$, we use a commutative algebra result of Berger, Klosin, and Kramer to bound the depth of Eisenstein congruences modulo p (from below) by the p-adic valuation of the numerator of $\frac{\varphi(N)}{24}$. We then show that if N has at least three prime factors and some prime $p \geq 5$ divides $\varphi(N)$, the Eisenstein ideal is not locally principal. Time-permitting, we will illustrate these results with explicit computations and give an interesting commutative algebra application related to Hilbert-Samuel multiplicities. (Received February 09, 2017)