

**Results on Eisenstein series and application to explicit results
about p -adic analytic families of modular forms in level one**

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This is joint work with Ian Kiming. Let E be Coleman's p -adic Eisenstein series defined by

$$E = 1 + \frac{2}{L_p(0, \mathbf{1})} \sum_{n=1}^{\infty} \left(\sum_{d|n, p \nmid d} \frac{1}{\tau(d)} \right) q^n,$$

where p is a prime bigger than 2 and τ is the Teichmüller character with values in $\mu(\mathbb{Q}_p)$. As a p -adic modular form, E is of weight 0 and level 1. We will explain some results relative to the p -adic modular function $e = \frac{E}{V(E)}$.

In particular if $p \in \{3, 5, 7, 13\}$, then the modular curve $X_0(p)$ has genus 0; let t_p be the Hauptmodul. In these cases we will show explicit results about the p -adic valuation of the t_p -expansion of e and how those apply to the study of p -adic analytic families of modular forms of level 1 and fixed slope.

When $p = 5, 7$ this leads to some explicit congruences modulo powers of p between classical modular forms of different weights in level 1.