Philadelphia Area Number Theory Seminar

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Explicit non-Gorenstein $R = T$ via rank bounds

Abstract: In his seminal work on modular curves and the Eisenstein ideal, Mazur studied the existence of congruences between certain Eisenstein series and newforms, proving that Eisenstein ideals associated to weight 2 cusp forms of prime level are locally principal. In this talk, we'll explore generalizations of Mazur's result to squarefree level, focusing on recent work, joint with P. Wake and C. Wang-Erickson, about a non-optimal level N that is the product of two distinct primes and where the Galois deformation ring is not expected to be Gorenstein. First, we will outline a Galois-theoretic criterion for the deformation ring to be as small as possible, and when this criterion is satisfied, deduce an $R = T$ theorem. Then we'll discuss some of the techniques required to computationally verify the criterion.

Tuesday, October 4, 2022
3–5 PM

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Informal refreshments at 3PM – Talk at 3:30PM