THE ARITHMETIC OF MODULAR FORMS ASSOCIATED TO FERMAT CURVES

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Abstract

For an odd integer N, we study the action of Atkin's U(2)-operator on the modular function $x(\tau)$ associated to the Fermat curve: $X^N + Y^N = 1$. The function $x(\tau)$ is modular for the Fermat group $\Phi(N)$, generically a noncongruence subgroup. If $x(\tau) = q^{-1} + \sum_{i=1}^{\infty} a(iN-1)q^{iN-1}$, we essentially prove that $\lim_{n\to 0} a(n) = 0$ in the 2-adic topology.

If time permits, we'll mention a conjecture related to Atkin and Swinnerton-Dyer congruences for certain cusp form of weight 3 for Fermat group $\Phi(3)$.