Eisenstein Series Whose Fourier Coefficients Involve Zeta Functions of Binary Hermitian Forms

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Abstract

In 1975, Cohen generalized Hurwitz class number using Dirichlet's class number formula to a number $H(r,n)$ which is closely related to the value of a certain Dirichlet L-series at $1-r$ and showed that for $r \geq 2$ the generating function $\sum_{n=0}^{\infty} H(r,n)q^n$ is a modular form of weight $r+1/2$ on $\Gamma_0(4)$. In this talk, I will begin by describing Hurwitz class number and class number relations and then proceed to discuss Cohen's result. I will then discuss a family of modular forms on $\Gamma_0(N)$ which were constructed by Ueno in a similar way as Cohen's construction where the numbers $H(r,n)$ are replaced with zeta functions of binary Hermitian forms evaluated at integral arguments. Finally, I will discuss some new work (joint with Jorge Flórez and An Hoa Vu) showing that the generating series considered by Ueno are in fact Eisenstein series and as a consequence we obtain an explicit formula for the special values of zeta functions associated with binary Hermitian forms.