

A COMPLETION OF A GENERATING SERIES OF DUKE-IMAMOGLU-TOTH

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I report on joint work in progress with K. Bringmann and M. Schwagenscheidt. We construct a real analytic modular form $\Omega(\tau, z)$ of weights $3/2$ and 2 which can be considered as a modular “completion” of a generating series considered by Duke-Imamoglu-Toth of the weakly holomorphic modular forms g_{n^2} of weight $3/2$, related to the traces of singular moduli of the j -function. Computing the Fourier expansion in z shows that this function also happens to be a generating series of modular forms of weight 2 , whose Fourier coefficients also are traces of certain CM-values. We also show that Ω satisfies a differential equation with respect to the Laplace operator in τ and z and maps to well-known non-holomorphic theta functions for a quadratic space of signature $(1, 2)$ under the lowering operators in τ and z (namely, the Kudla-Millson theta function in z and a Siegel theta function in τ).