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Intersection theory on Shimura surfaces

Kudla, Rapoport, and Yang and have proved the equality of two modular forms of weight $3/2$. One is an Eisenstein series, and the other is a formal q-expansion which encodes the arithmetic intersection numbers of CM points on a Shimura curve. Using this equality of modular forms those authors deduce a formula relating the height of a CM point in a modular Jacobian to the central derivative of an L-series, much in the spirit of the Gross–Zagier theorem. I will discuss work in progress toward a similar result for Shimura surfaces, relating the intersection multiplicities of special cycles to the Fourier coefficients of a Hilbert modular Eisenstein series of parallel weight $3/2$.