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Generating series for arithmetic cycles

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Abstract

In the first two lectures, I will report on some of the results contained in the forthcoming book, Modular Forms and Special Cycles on Shimura Curves, joint with M. Rapoport and T. Yang.

In the first lecture I will describe the generating function for divisors on the arithmetic surface \mathcal{M} associated to a Shimura curve M over \mathbb{Q} . The fact that this series is the *q*-expansion of a modular form of weight 3/2 is proved by analyzing its components in various subspaces of the arithmetic Chow group $\operatorname{CH}^1(\mathcal{M})$. For example, the modularity of the Mordell–Weil component is derived using Borcherds results on the generators and relations for certain spaces of modular forms and his construction of meromorphic modular forms on \mathcal{M}