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Recent Developments for Multiple Eisenstein Series

Thursday 4 September 2025 09:30 (1 hour)

Multiple Eisenstein series, introduced in 2006 by Gangl-Kaneko-Zagier, form a bridge between multiple zeta values and classical Eisenstein series. In this talk, I will discuss recent developments and conjectures concerning these series, with a focus on a possible \mathfrak{sl}_2 -algebra structure. By this, we mean an algebra A equipped with an injective Lie algebra homomorphism from the three-dimensional Lie algebra \mathfrak{sl}_2 into the derivation algebra $\text{Der}(A)$. A classical example is the algebra of quasimodular forms, which carries three natural derivations satisfying the \mathfrak{sl}_2 commutation relations. The algebra of multiple Eisenstein series contains the quasimodular forms as a subalgebra. I will present a conjectural framework suggesting that the \mathfrak{sl}_2 -structure on quasimodular forms extends naturally to this larger algebra. Finally, I will outline a dimension conjecture for the space of multiple Eisenstein series, which indicates that the presence of an \mathfrak{sl}_2 -structure might be the key feature distinguishing them from multiple zeta values.

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