Polylogarithms, homology of linear groups, and Steinberg modules



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Cusp forms and the depth filtration

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The goal of this talk is to explain the mechanism by which cusp forms of certain congruence subgroups of SL < sub > 2 < /sub > (Z) impose relations in the depth filtration of the motivic fundamental group of the category of mixed Tate motives unramified over the ring Z[mu < sub > N < /sub > ,1/N]. The known depth 2 relations in the case N=1, first observed by Ihara and Takao, were proved by Francis Brown and Hain–Matsumoto. (Both proofs use a period computation due to Brown). One should be able to similarly establish depth 2 relations when N is a prime number > 5. The first steps towards this goal were taken by Eric Hopper in arXiv:2208.01153 using the elliptic KZB connection for the universal family of elliptic curves with a cyclic subgroup of order N removed, which was written down by Calaque and Gonzalez. I will explain his work and how it isolates the period computations that control the relations.

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