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Cohomology groups of moduli spaces of curves

The cohomology groups of moduli spaces of curves are important to several mathematical disciplines, from low-dimensional topology and geometric group theory to stable homotopy theory and quantum algebra. Algebraic geometry endows these groups with additional structures, such as Hodge structures and Galois representations, and the Langlands program makes striking predictions about which such structures can appear. I will survey recent results confirming several of these predictions and making progress toward calculating these groups and determining in which degrees they do and do not vanish.