The reduced Dijkgraaf–Witten invariant of twist knots in the Bloch group of $\mathbb{F}_p$

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５１号館１７階 17-06 セミナー室

Waseda University, Nishiwaseda Campus, 51st building, 17th floor, room 17-06

Abstract

For a closed oriented 3-manifold M, a discrete group G, a 3-cocycle α of G, and a representation $\rho\colon \pi_1(M) \to G$, the Dijkgraaf–Witten invariant is defined to be $\rho^*\alpha[M]$, where $[M]$ is the fundamental class of M, and $\rho^*\alpha$ is the pull-back of α by ρ. We consider an equivalent invariant $\rho_*[M] \in H_3(G)$, and we also regard it as the Dijkgraaf–Witten invariant. In 2004, Neumann described the hyperbolic volume and Chern–Simons invariant of M in terms of the image of the Dijkgraaf–Witten invariant for $G = \mathrm{SL}_2\mathbb{C}$ by the Bloch–Wigner map $H_3(M) \to \mathcal{B}(\mathbb{C})$, where $\mathcal{B}(\mathbb{C})$ is the Bloch group of $\mathbb{C}$. Further, in 2013, Hutchinson gave a construction of the Bloch–Wigner map $H_3(\mathrm{SL}_2\mathbb{F}_p) \to \mathcal{B}(\mathbb{F}_p)$ explicitly, where p is prime, and $\mathbb{F}_p$ is the finite field of order p.

In this talk, I calculate the reduced Dijkgraaf–Witten invariant of the complement of twist knots, where the reduced Dijkgraaf–Witten invariant is the image of the Dijkgraaf–Witten invariant for $\mathrm{SL}_2\mathbb{F}_p$ by the Bloch–Wigner map $H_3(\mathrm{SL}_2\mathbb{F}_p) \to \mathcal{B}(\mathbb{F}_p)$.

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