2-29

Gregor Masbaum: TQFT and modular representations of mapping class groups

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10:03 PM

$$\sum_{j=1} \left(\sin \frac{\pi j}{p}\right)$$

Witten-Reshetikhin-Turaev Quantum rep. of M.C.G.

$SO(3)$, $q = \xi_p$ root of unity of order p.

$$\widetilde{\rho}_p : \widetilde{\Gamma}_g \to GL(N, \mathbb{C})$$

$\widetilde{\Gamma}_g$ ↑ central extension of M.C.G of Σ_g by $\mathbb{Z}$

$GL(N, \mathbb{C}) \hookrightarrow N_p(g)$

$$\rho_p : \Gamma_g \to PGL(N, \mathbb{C})$$

$$N = N_p(g) = \dim V_p(\Sigma_g) \xrightarrow[p \to \infty]{g \text{ fixed}} \infty$$

Constructed via skein theory following BHMV

Computer program: $tqft_{gp}$

with Gilmer: can replace $\mathbb{C}$ by $\mathbb{Z}[\xi_p]$,

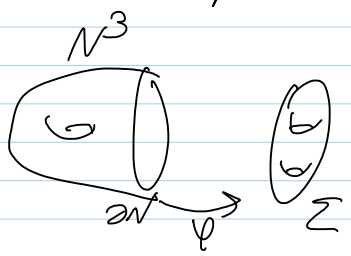
the ring of algebraic integers in the cyclotomic field $\mathbb{Q}(\xi_p)$

Gilmer-Masbaum

Thm $\exists$ a natural $\mathbb{Z}[\xi_p]$-free lattice of full rank $S_p(\Sigma) \subset V_p(\Sigma)$ preserved by the $\widetilde{\Gamma}_g$-action.

The lattice is the lattice coming from 3-manifolds w/ no closed components:

$$Z_p(N, \varphi) \in V_p(\Sigma)$$



$$\mathbb{Z}[\zeta_p]/(1-\zeta_p) = F_p$$

"Every number theory class does this"

Vardini's formula:

$$\dim S_p(\Sigma_g) = \left(\frac{p}{4}\right)^{g-1} \cdot \frac{(p-1)/2}{}$$

polynomial of degree $3g-3$ in p.

Gregor - you should learn "introduction" and "motivation" & have a better estimate the audience's background.