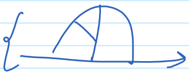
Wednesday-11 AKT on 140326: Fixing the Anomaly

March-19-14 11:12 AM

$D \in P\mathcal{D} := \{$  : trivalent, connected after removal of skel, all else the same $\}$

$$\dim = 3|V_i| + |V_s| - 2 \qquad C^{ano}_{D,l_0} \longrightarrow C^{ano}_D \xrightarrow{\Phi_D} (S^2)^{E_i}$$

$$C^{ano}_D \xrightarrow{\pi_l} S^2 \qquad \dim = 2|E_i| = 3|V_i| + |V_s|$$

The skeleton points in some S^2 direction l, Then take $C^l_D /$ translations & dilations along l

The anomaly 2-form:

$$\alpha = \sum_D \frac{[D]\alpha_D}{|\mathrm{Aut}\, D|} = \sum_{D \in P\mathcal{D}} \frac{[D]}{|\mathrm{Aut}\, D|} \pi_{l*} \Phi_D^* w^{E_i} \in \Omega^2(S^2, \mathcal{A}(\uparrow))$$

A 1-Form on immersions $\gamma: S^1 \to \mathbb{R}^3$:

Gauss map

$$\begin{array}{ccc} S^1 \longrightarrow \left\{\begin{array}{c}\text{based}\\ \text{paths}\end{array}\right\} & \xrightarrow{\gamma'_t} & S^2, \alpha \\ \downarrow \pi^G & & \\ \tilde{\Gamma} \text{ (all immersions)} & & \end{array}$$

$$A = \sum \frac{[D]}{|\mathrm{Aut}\, D|} A_D := \pi^G_* \gamma'^*_t \alpha \in \Omega^1(\tilde{\Gamma}, \vec{\mathcal{A}})$$

prop. $dZ_0 = Z_0 \cdot A$

proof sketch.

$$\begin{tikzcd}
\partial^{ano} C^{\gamma}_D \arrow[r] \arrow[d] \arrow[dr] \arrow[dd, bend right] & \bigcup_{D = D' \cup D''} C^{ano}_{D'} \times C^{\gamma}_{D''} \arrow[d] \arrow[r] & w^{E_i(D')} \times w^{E_i(D'')} \\
w^{E_i(D)} \arrow[urr, dashed] & & \\
S^1 \times \Gamma \arrow[r, "{(t,\gamma) \mapsto (\gamma'(t), \gamma)}"] \arrow[d, "\pi_G"] & S^2 \times \Gamma, \ \sum \alpha_{D'} \cdot I(D'', \gamma) & \\
\Gamma, \ \sum A_{D'} \cdot I(D'', \gamma) & &
\end{tikzcd}$$

1   2

Use: 1. Push forward of a push forward is a push forward.

2. Push forward commutes w/ pull back:

$$\begin{array}{ccc} T_2 = \beta^* T_1 & \xrightarrow{\beta} & T_1, w \\ \pi_2 \downarrow & & \downarrow \pi_1 \end{array} \qquad \beta^* \pi_{1*} w = \pi_{2*} \beta^* w$$

$$B_2 \xrightarrow{\beta} B_1$$

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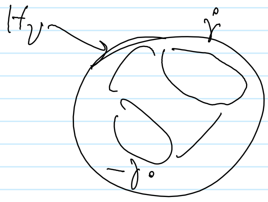
if ω is uniform, α is a multiple of ω.
if ω is AS, so is α.

Now given a framed knot (γ, ν),
define

$$Z(\gamma, \nu) = Z_0(\gamma) \cdot e^{-\frac{1}{2}\int_{H_\nu} \alpha}$$



Thm $dZ = 0$; that is, Z is an invariant of framed knots. It remains a UFTI.

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managing signs and combinatorial factors.