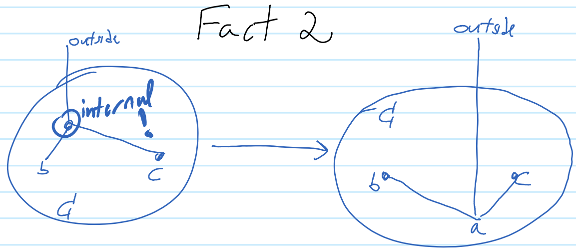
Wednesday-10 AKT on 140319: Hidden faces, fixing the anomaly

March-16-14 3:17 PM

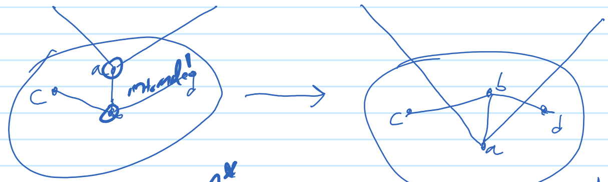
The Hidden Faces: [connected clusters of size ≥ 3; $\triangle \longrightarrow V$, C, C^c]

$$C_D^\gamma \to T \to (S^2)^E, \qquad T \xrightarrow{\pi} \Gamma$$

Fact 2

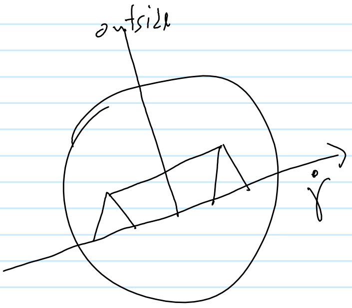


Fact 3



assuming $A^*\omega = -\omega$, A = antipodal map

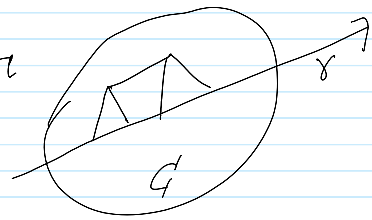
Fact 1 if $(D\text{'s})|_G$ is not connected, then $\pi_*^c \Phi_D^* \omega^{E_i} = 0$

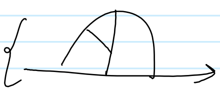


$\xrightarrow{I_\gamma} 0$

Pf There is a vertical vector field that kills the integrand.

$\Rightarrow$ The only hidden faces that remain are the "anomalous faces"



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

$$C_D^{ano} \longrightarrow T \xrightarrow{\Phi_D} (S^2)^{E_i}, \qquad T \xrightarrow{\pi_l} S^2$$

$\dim = 2|E_i| = 3|V_i| + |V_s|$

The skeleton points in some S^2 direction l, then take

C_D^l / translations & dilations along l $\quad \dim = 3|V_i| + |V_s| - 2$

$\pi_{l*}\Phi^*\omega^{E_i}$ is a 2-form on S^2...

Definition The anomaly 2-form:

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

$$\alpha = \sum_{D \in \mathcal{PD}} \frac{[D]}{|\mathrm{Aut}\, D|} \pi_{l*} \Phi_D W^{F_l} \in \Omega^2(S^2; \mathcal{A}(\uparrow))$$

<u>Example</u> α_1 (comes from )

<u>The "Vanishing of the anomaly" conjecture:</u> $\alpha = \alpha_1$

proven to degree 5 (maybe 6) by Poirier/Lescop.

<u>Def</u> A 1-form on immersions $\gamma : S^1 \to \mathbb{R}^3$:

$$\begin{tikzcd}
S^1 \arrow[r] \arrow[dr, bend right, "\text{Gauss map}"'] & \left\{\begin{matrix}\text{based}\\ \text{paths}\end{matrix}\right\} \arrow[r, "\dot\gamma_t"] \arrow[d, "\pi^G"] & S^2, \alpha \\
& \tilde\Gamma \text{ (all immersions)} &
\end{tikzcd}$$

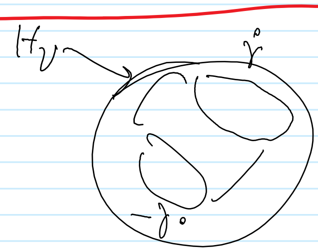
$$A := \pi^G_* \dot\gamma_t^* \alpha \quad \text{is in} \quad \Omega^1(\tilde\Gamma, \mathcal{A})$$

<u>Claim</u> $dZ_0 = Z_0 \cdot A$ } stated, but not proven in full.

done line

Now given a framed knot (γ, v),

define



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

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