Let's consider a general hol / top thy on

$$\mathbb{C}^5_{\bar\partial} \times \mathbb{R}_{dR} .$$

This means that the linear BRST complex is of the form

$$\Big(\Omega^{0,\bullet}(\mathbb{C}^5) \hat\otimes \Omega^\bullet(\mathbb{R}) \otimes V \, , \, \overbrace{\bar\partial_{\mathbb{C}^5} + d_{\mathbb{R}} + D}^{Q} \Big)$$

for some f.d. vector space V, and

D is holomorphic diff. operator.

The "hol / top" gauge is

$$Q^{GF} = \bar\partial^* + d^* .$$

$$\Rightarrow \quad [Q, Q^{GF}] = \Delta_{\bar\partial} + \Delta_d \curvearrowright \mathbb{C}^5 \times \mathbb{R} .$$

Coordinatize $(z, t) \in \mathbb{C}^5 \times \mathbb{R}$.

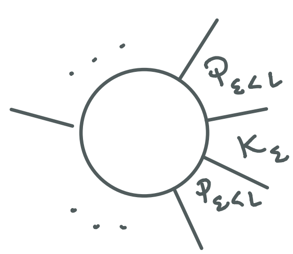
Roughly, the heat kernel for $[Q, Q^{GF}]$ is of the form:

$$K_T = \frac{1}{(4\pi T)^{n/2}} \exp\left\{ -\left(|z|^2 + t^2\right) / 4T \right\}$$

$$\times \left(\sum_i dz_i \, d\bar{z}_i \right) dt \, .$$

Let us forget about differential form type, and just focus on the asymptotic behavior of graphs.

If $W_{n+1}(\varepsilon, L)$ is the following weight



$(n+1)$-vertex wheel

Then, standard bounds imply $|w_n(\varepsilon, L)|$ is bounded by a regularized integral of the form

$$\int_{\vec{T} \in [\varepsilon, L]^n} \frac{d^n \vec{T}}{(\varepsilon + T_1 + \cdots + T_n)^{11/2}} .$$

Now, this is further bounded by

$$\overset{\text{AM-GM}}{\leq} \int_{\vec{T} \in [\varepsilon, L]^n} \frac{d^n \vec{T}}{(T_1 \cdots T_n)^{11/2n}} .$$

$$= \# \left(\varepsilon^{1 - \frac{11}{2n}} - L^{1 - \frac{11}{2n}} \right)$$

Generally the scale L anomaly is

$$\Theta[L] = \lim_{\varepsilon \to 0} \sum_{n \geq 0} w_{n+1}(\varepsilon, L) .$$

Further, the local anomaly is a cocycle

$$\Theta = \lim_{L \to 0} \Theta[L] \in \left(\mathcal{O}_{loc}(\mathcal{E}), \{S, -\} \right)$$

Two steps:

1) When # vertices $= n+1 \leq 6$ then

I claim $\omega_{n+1}(\varepsilon, L) \equiv 0$ for all ε, L.

This follows by form type reasons.

2) When # vertices $= n+1 \geq 7$ then the

$\varepsilon \to 0$ limit of $\omega_{n+1}(\varepsilon, L)$ exists since

$$\varepsilon^{2n-11} \xrightarrow{\varepsilon \to 0} 0.$$

Furthermore

$$\omega_{n+1}(0, L) \xrightarrow{L \to 0} 0 \quad \text{in this regime.}$$

So, in fact

$$H = \lim_{L \to 0} H[L] = 0 \quad !$$