This assignment is due in class on Monday, March 17, 2014.

Question #1. Prove that so(3) Wight systems $W_{so(3), R}$ satisfy the following additional identities, no matter which representation $R$ is chosen:

\[ A. \quad \begin{array}{c} \hline \hline \end{array} = C_1 \begin{array}{c} \hline \hline \end{array}, \]

\[ B. \quad \begin{array}{c} \hline \hline \end{array} = C_2 \sum_{i=1}^{3} \begin{array}{c} \hline \hline \end{array}. \]

In these two identities all edges are integral (the skeleton is not involved), and the constants $C_1$ and $C_2$ depend only on the choice of the metric.

Bonus: what mean, these two, in the language of vector calculus and/or determinants?

Question #2. Explain why infra-red divergences [meaning, faces that come from clusters $\rightarrow \infty$] do no harm to the diagram

\[ \begin{array}{c} \hline \hline \end{array} \rightarrow \begin{array}{c} \hline \hline \end{array} \rightarrow \begin{array}{c} \hline \hline \end{array} \rightarrow \begin{array}{c} \hline \hline \end{array}, \quad \text{"The part complex"} \]

\[ \begin{array}{c} \hline \hline \end{array} \rightarrow \begin{array}{c} \hline \hline \end{array} \rightarrow \begin{array}{c} \hline \hline \end{array}, \quad \text{"Knot space cohomology"} \]

Question #3. Verify that indeed, under $D \rightarrow D^g := g^{-1} D g$ and with $D_4 S = D S + A S$ we get $D^g = D g^{-1} A g + g^{-1} D g$.

http://dorbn.net/bbs/show?shot=AKT14-140307-101950.jpg

cancelled - identical to Q3 of HW6.