

Home work set # 12 - Last set, due November 25, 202

- 1) Do Exercise 15.14 of GS
- 2) Do Exercise 15.26 of GS
- 3) Calculate the Killing metric tensor for $SU(2)$, show how it is related to the structure constants of $SU(2)$

4) Consider $S(g) = \frac{1}{24\pi^2} \int_{\mathbb{R}^3} \text{tr}(g^{-1} dg)^3$
 $g \in SU(2)$

Show that $S(g)$ is a topological invariant by showing

$$S(g + \delta g) - S(g) = 0$$

$g \equiv g(\vec{x})$ is an $SU(2)$ valued function on \mathbb{R}^3