

Homework 4

1. Consider \mathbb{C} and S^1 -action on \mathbb{C} is defined as follows

$$S^1 \times \mathbb{C} \rightarrow \mathbb{C}, \quad z \rightarrow e^{i\alpha} z.$$

Calculate the equivariant cohomology $H_{S^1}(\mathbb{C})$ for this action.

2. Take a two sphere S^2 and calculate the following trace over the space of all differential forms $\Omega^\bullet(S^2)$

$$\text{tr}((-1)^F e^{-\beta\Delta}),$$

where Δ is Laplace operator on forms.

Do the same for S^3 . Why the answers are different?

[*Hint*: see the lecture notes for the notations]

to be handed in before 5 p.m., March 15, 2010