

## Homework 2

### Geometrical methods in theoretical physics HT-14

1. Consider a Riemannian compact manifold and define Laplace operator

$$\Delta = d^\dagger d + dd^\dagger$$

on differential forms. Are there negative eigenvalues for  $\Delta$ ? Explain the answer.

2. Consider  $S^1$ -fibration  $S^5 \rightarrow \mathbb{C}P^2$ . Give the explicit description of the trivialisation of this principle bundle. Calculate explicitly the transition functions. (If you are confused about this problem, don't hesitate to ask me for the details)

**to be handed in before 5 p.m., January 15, 2015**