SF2723 Topics in Mathematics - Matrix groups
Homework Assignment 8
2008-10-29

The solutions should be handed in no later than November 5, 2008. The final grade will be based upon the total score on the homework and on the oral exam. The total maximal score on the homework assignments is 200 and in order to pass, at least 100 is required.

In order to get full score on each problem, the written presentation of the solution should be clear and the arguments easy to follow.

1. Show that any space is compact in the finite complement topology and that only finite spaces are compact in the discrete topology. **(3)**

2. Determine whether projective spaces $\mathbb{P}^n_{\mathbb{R}}$ and $\mathbb{P}^n_{\mathbb{C}}$ are compact or not. **(4)**

3. Show that the unit interval $[0, 1]$ is connected. **(3)**

4. Use epsilon calculus to compute the tangent space to the space given by the complex matrices of size 2×3 of rank at most one. **(4)**