

Math 371 - Lie Theory

Homework Assignment 1

Due Aug 31

1. Let G be a group and $g \in G$. Prove that the map $g : G \rightarrow G$ given by $g(h) = gh$ is a bijection.
2. Give a matrix group representation of the group of symmetries of the circle.
3. Consider the action of the group of symmetries of the square on the set of four vertices of the square. Extend the action linearly to the span of a vector space spanned by a basis indexed by the vertices. This gives a representation of the group of symmetries of the square in terms of 4×4 matrices. Find those matrices.
4. Problem 1.1.1 from the textbook.
5. Problem 1.2.4 from the textbook.
6. Problem 1.2.5 from the textbook.
7. Does there exist a Lie group structure on the curve ∞ ? If your answer is yes, then give an example. If your answer is no, explain why not.