Homework 1
Due date: Feb 4th, 2019

January 25, 2019

**Problem 1:** Show that the two real Lie algebras $su(2)$ and $so(3)$ are isomorphic.

**Problem 2:** Show that the two real Lie algebras $su(2)$ and $sl(2, \mathbb{R})$ are not isomorphic. But they are isomorphic after complexification:

$$su(2)_c \cong sl(2, \mathbb{R})_c.$$

**Problem 3:** For the Lie algebra $su(n)$, the Killing form is given by

$$B(X, Y) = 2n \cdot \text{Tr}(XY).$$