

11. Exercise sheet

This sheet will be discussed on 18.01.2019

Exercise 1

Show that the diagonal matrices form a Cartan subalgebra of $\mathfrak{gl}(n, \mathbb{C})$.

Exercise 2

Show that a complex semisimple Lie algebra of rank 1 (i.e. with a 1-dimensional Cartan subalgebra) is isomorphic to $\mathfrak{sl}(2, \mathbb{C})$.

Exercise 3

Show that the complexifications of $\mathfrak{sl}(n, \mathbb{R})$ and $\mathfrak{su}(n)$ are both equal to $\mathfrak{sl}(n, \mathbb{C})$.