

12. Exercise sheet

This sheet will be discussed on 25.01.2019

Exercise 1

Carry out the details of the computations for the root system of $\mathfrak{so}(2n+1, \mathbb{C})$ given in Section 6.2 of the lecture.

Exercise 2

Consider the root system of the Lie algebra $\mathfrak{sl}(4, \mathbb{C})$ for the Cartan subalgebra

$$\mathfrak{h} = \{diag(h_1, h_2, h_3, h_4) | h_i \in \mathbb{C}, \sum_{i=1}^4 h_i = 0\}.$$

Draw a picture of the root vectors H_α in $\mathfrak{h}_{\mathbb{R}} (\cong \mathbb{R}^3)$.

Exercise 3

Let $\alpha, \beta \in \Delta$ be roots of a complex semisimple Lie algebra with respect to a Cartan subalgebra.

- a) Show that the number of elements in the α -string containing β is at most 4.
- b) Give an example of a maximal string (of length 4).