

Homework 9, due Thursday October 29

1. Let \mathfrak{g} be a semisimple complex Lie algebra. A subalgebra of \mathfrak{g} is a Cartan subalgebra iff it consists entirely of semisimple elements and is maximal with respect to this property.
2. Let \mathfrak{g} be a semisimple complex Lie algebra. Show

$$\mathfrak{b} = \mathfrak{h} \oplus \bigoplus_{\alpha > 0} \mathfrak{g}_{\alpha}$$

is a maximal solvable subalgebra (called the Borel subalgebra). Show that all Borel subalgebras are equivalent.