66. Show that centraliser of \((\begin{smallmatrix} 1 & 0 \\ 0 & 1 \end{smallmatrix})\) \(\in\) \(\text{PGL}_2(\mathbb{C})\) is disconnected.

67. For \(B \subseteq G\) a Borel subgroup of a connected linear algebraic group \(G\), show that \(Z(B) = Z(G)\).

68. Prove directly for \(G = \text{SL}_n\) and for \(G = \text{SO}_n\) (with the bilinear form from Problem 31) that \(G\) is covered by Borel subgroups and that maximal tori coincide with their centralisers.

69. Let \(G\) be a connected linear algebraic group with a maximal torus and \(\mathfrak{B}\) be the set of Borel subgroups of \(G\) with its natural \(T\)-action. Show that there is a bijection between the fixed point set \(\mathfrak{B}^T\) and the Weyl group \(W(G)\).

70. Show that the following subsets define root systems of rank \(n\):

\[
\{\pm e_i \mid i \in \{1, \ldots, n\}\} \cup \{\pm e_j \pm e_i \mid i, j \in \{1, \ldots, n\}, i < j\} \subset \mathbb{Q}^n \text{ (type } B_n) \\
\{\pm 2e_i \mid i \in \{1, \ldots, n\}\} \cup \{\pm e_j \pm e_i \mid i, j \in \{1, \ldots, n\}, i < j\} \subset \mathbb{Q}^n \text{ (type } C_n) 
\]