

Math 534. Written problems, set 3.

- (1) Humphreys, Exercise 2 on p.34.
- (2) Construct the root systems and Dynkin diagrams for the Lie algebras \mathfrak{so}_5 and \mathfrak{sp}_4 . (The calculation will depend on your choice of the matrix J defining the corresponding Lie algebra – recall that both are defined as $\{X \in \mathfrak{gl}_n \mid X^t J + JX = 0\}$, but the final answer won't). For J , you can use the matrices defined in Humphreys, p.3, or alternatively, anti-diagonal with all 1s in the case of \mathfrak{so}_5 , and with $1, 1, -1, -1$ in the case of \mathfrak{sp}_4 , are also a reasonable choice.
- (3) Humphreys, Exercise 9.4 on p.46.