

Math 461/561 Homework #11: Due Thursday December 17

1. Erdmann-Wildon #14.4
2. Erdmann-Wildon #15.8
3. Describe the weights and highest weight for the natural representations of the matrix algebras in types A_l, B_l, C_l and D_l . (As we did in class for $\mathfrak{sl}(3)$.)
4. Construct explicitly the infinite-dimensional Verma module $M(-1)$ for $\mathfrak{sl}(2)$, i.e. give a basis and a description of the actions of e, f, h .
5. Let V be the natural representation of $\mathfrak{sl}(3)$ and let $V(1, 2)$ be the representation with highest weight $\epsilon_1 - 2\epsilon_3$. Decompose the tensor product $V \otimes V(1, 2)$ into irreducibles.