

MAT4270: ORAL EXAM (PART 1)

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This is the set of problems for the first part of oral exam.

Consider the Lie algebra $\mathfrak{g} = \mathfrak{so}_5$.

- give a Cartan subalgebra \mathfrak{h} of \mathfrak{g} .
- give the roots R for $(\mathfrak{g}, \mathfrak{h})$.
- choose an order on R , and give $\mathfrak{n}_+ = \bigoplus_{\alpha \in R_+} \mathfrak{g}_\alpha$.
- compute the lower central series of \mathfrak{n}_+ .
- determine if $\mathfrak{b} = \mathfrak{h} \oplus \mathfrak{n}_+$ is nilpotent.