UK TUTORIAL SHEET 1
IDEALS AND HOMOMORPHISMS, NILPOTENT AND SOLVABLE LIE ALGEBRAS

Humphreys 2.6, 2.7, 2.10, 3.8, 3.9, 3.10, 4.1, 4.3.

(1) Let $X = X_s + X_n$ be the Jordan decomposition of $X \in \mathfrak{gl}(V)$. Show that $\operatorname{ad} X = \operatorname{ad} X_s + \operatorname{ad} X_n$ is the Jordan decomposition of $\operatorname{ad} X$.