

Let  $T$  be a linear transformation  $T : V \longrightarrow V$ , that is  $W$ -invariant for some subspace  $W$

- (1) Suppose  $T$  is invertible. Show that  $(\bar{T})^{-1} = \overline{T^{-1}}$ .
- (2) Show that  $T^t$  is  $W^0$ -invariant (don't assume invertible anymore).

Let  $S$  be a linear transformation  $S : V \longrightarrow W$

- (1) Show that if  $S$  is injective then  $S^t$  is surjective.
- (2) Show that  $\ker S^t = (\operatorname{im} S)^0$ .