Suppose  $T\in\mathcal{L}(V)$  and  $\lambda\in\mathbb{F}$ . Prove that  $\lambda$  is an eigenvalue of T iff  $\overline{\lambda}$  is an eigenvalue of  $T^*$ .

## 1 | Forward Direction

Given  $\overline{\lambda}$  is an eigenvalue of  $T^*$ , show that  $\lambda$  is an eigenvalue of T.