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

Given λ is an eigenvalue of T, show that $\overline{\lambda}$ is an eigenvalue of T^*. This will imply both directions, since $\lambda = \overline{\overline{\lambda}}$ and $T = T^{*^*}$

There exists some v s.t.

$$Tv = \lambda v$$

$$\langle \lambda v, w \rangle = \langle Tv, w \rangle = \langle v, T^* w \rangle$$