

SEVENTH HWK, DUE THURSDAY NOVEMBER 13TH

Feel free to work with others, but the final write-up should be entirely your own and based on your own understanding.

1. (10pts) Show that if A and $B \in M_{n,n}(F)$ are similar matrices then

$$\dim E_\lambda(A) = \dim E_\lambda(B),$$

for every $\lambda \in F$. In particular A and B have the same eigenvalues. Do A and B have to have the same eigenvectors?

2. (15pts) (3.5.9) page 230.
3. (10pts) (3.5.10) page 230.
4. (5 pts) Let $\phi: V \rightarrow V$ be a linear map. Let W be the subspace spanned by the eigenvectors of ϕ union the zero vector. Show that $\phi(W) \subset W$.
5. (5 pts) (3.5.13), page 230.
6. (5 pts) (3.5.15), page 231.