

Math 307 Homework
September 30, 2015

1. Suppose that $\mathbf{A} \in M_n(\mathbb{F})$ has n distinct eigenvalues. Show that there is a basis of \mathbb{F}^n consisting of eigenvectors of \mathbf{A} .
2. Suppose that $\mathbf{T} \in \mathcal{L}(V, W)$ and that V is finite dimensional. Prove that $\dim \text{range } \mathbf{T} \leq \dim V$.
3. Prove that the space \mathbb{F}^∞ of infinite sequences with entries in \mathbb{F} is infinite dimensional.