

1 | **Axler6.56 Minimizing the distance to a subspace**

Suppose U is a finite-dimensional subspace of V , $v \in V$, and $u \in U$. Then,

$$\|v - P_U v\| \leq \|v - u\|$$

Because we often end up having to find the minimal $\|v - u\|$ where $u \in U$, this result makes linear algebra applicable to numerous real-world applications.