1 | **Axler6.53 orthogonal projection, P_U def**

Suppose U is a finite-dimensional subspace of V. The *orthogonal projection* of V onto U is the operator $P_U \in \mathcal{L}(V)$ defined as follows:

For $v \in V$, write $v = u + w$, where $u \in U$ and $w \in U^\perp$. Then $P_U v = u$.

In other words, $P_U \in \mathcal{L}(V)$ takes v to the component of v that is in U.