

## 1 | eigenspace, $E(\lambda, T)$

**def**

Suppose  $T \in \mathcal{L}(V)$  and  $\lambda \in \mathbb{F}$ . The *eigenspace* of  $T$  corresponding to  $\lambda$  denoted  $E(\lambda, T)$ , is defined by

$$E(\lambda, T) = \ker(T - \lambda I)$$

In other words,  $E(\lambda, T)$  is the set of all eigenvectors of  $T$  corresponding to  $\lambda$ , along with the 0 vector.

### 1.1 | results

1.1.1 |  $\lambda$  is an eigenvalue of  $T$  iff  $E(\lambda, T) \neq \{0\}$

1.1.2 | **Axler5.38 sum of eigenspaces is a direct sum**

Because Axler5.10 linearly independent eigenvectors

Also, the dimension of the sum of eigenspaces will be less-equal than the dimension of the containing space (duh)