

$K$  field,  $A \in K^{m \times m}$ ,  $\lambda \in K$ ,  $v \in K^m \setminus \{0\}$

$Av = \lambda v \iff \lambda$  is an eigenvalue of  $A$   
 $v$  is an eigenvector of  $A$ .

$\text{Eig}(A, \lambda) := \{v \in K^m \mid Av = \lambda v\}$

$0 \in \text{Eig}(A, \lambda)$ ,  $0$  is not an eigenvector

$P_A(X) := \det(X \cdot E - A)$

$\lambda$  is an eigenvalue of  $A \iff P_A(\lambda) = 0$