

**Answer on Question #44923 – Math - Linear Algebra**

If zero is an eigenvalue of a linear transformation  $T$ , then  $T$  is not invertible.

**Answer**

True. If zero is an eigenvalue of a linear transformation  $T$ , so there is at least one non-zero vector  $\vec{v}$  such that  $T\vec{v} = 0$  (0 is an eigenvalue of  $T$  with corresponding eigenvector  $\vec{v}$ ). We see that the nullspace of  $T$  has dimension  $\geq 1$ . Since

$$\dim \text{col } T + \dim \text{nul } T = n$$

and

$$\dim \text{col } T = \text{rank } T$$

$\text{rank } T < n$ . Then  $T$  is not invertible.