

If  $T$  is an invertible linear transformation, then all eigenvalues of  $T$  are non-zero.

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*Proof.* Suppose  $T$  is invertible. Then  $T(v) \neq 0$  for  $v \neq 0$ , which is true of eigenvectors. Therefore 0 cannot be an eigenvalue of  $T$ , so all eigenvalues of  $T$  are nonzero.  $\square$