

MATH 4242 Quiz 5

Name: _____
Student Id: _____

Let T be the linear operator on \mathbb{C}^2 defined by

$$T(x, y) = (x + y, x - y)$$

Find the eigenvalues of T .

Proof. $T(e_1) = (1, 1) = e_1 + e_2$ and $T(e_2) = (1, -1) = e_1 - e_2$. so the matrix for T is $\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}$.

The characteristic polynomial is $\det \begin{pmatrix} 1-x & 1 \\ 1 & -1-x \end{pmatrix} = -(1-x)(1+x) - 1 = x^2 - 2$. So the eigenvalues are $\pm\sqrt{2}$. □