

JORDAN CANONICAL FORM

①

We have seen that not every linear transformation $T: V \rightarrow V$ is diagonalizable

example : $T: \mathbb{C}^2 \rightarrow \mathbb{C}^2$
 $\begin{pmatrix} x \\ y \end{pmatrix} \mapsto \begin{pmatrix} x+y \\ y \end{pmatrix}$

Let β be the standard basis for \mathbb{C}^2

Then $[T]_{\beta}^{\beta} = \begin{pmatrix} 1 & 1 \\ 0 & 1 \end{pmatrix}$, which we

have seen is not diagonalizable, so T is not diagonalizable

But we will show over the next couple of classes that even though we cannot always find a basis β for V such that $[T]_{\beta}^{\beta}$ is diagonal, we can (provided the characteristic polynomial of T splits) always find a basis β for V such that $[T]_{\beta}^{\beta}$ is in JORDAN CANONICAL FORM.