

# Diagonalization

S.3.11  $A = \begin{pmatrix} -1 & 4 & -2 \\ -3 & 4 & 0 \\ -3 & 1 & 3 \end{pmatrix} \quad \lambda = 1, 2, 3$

$$A - \lambda I = \begin{pmatrix} -2 & 4 & -2 & 0 \\ -3 & 3 & 0 & 0 \\ -3 & 1 & 2 & 0 \end{pmatrix} \rightarrow$$

~~Problem~~

$$y = \frac{y \cdot u_1}{u_1 \cdot u_1} \cdot u_1 + \frac{y \cdot u_2}{u_2 \cdot u_2} \cdot u_2$$

$$8 \cdot 64 + 24$$

$$9 + 1 \cdot 12$$

$$\begin{aligned} &= \frac{64+24}{66} / 11 = \frac{8}{6} = \frac{4}{3} \begin{pmatrix} -1 \\ 1 \\ 4 \end{pmatrix} = \begin{pmatrix} -\frac{2}{3} \\ \frac{4}{3} \\ \frac{16}{3} \end{pmatrix} + \frac{-2}{6} = \frac{-1}{3} \begin{pmatrix} -1 \\ 1 \\ -2 \end{pmatrix} \begin{pmatrix} 1/3 \\ -1/3 \\ 2/3 \end{pmatrix} \\ &u_1 + 16 \end{aligned}$$

$$\begin{pmatrix} 3 & -5 & 1 \\ 1 & 1 & 1 \\ -1 & 5 & -2 \\ 3 & -7 & 8 \end{pmatrix} \rightarrow \text{Probably pivot in each column}$$

$$v_2 = x_2 - \frac{x_2 \cdot x_1}{x_2 \cdot x_1} \cdot x_1 = \frac{-40}{20} = -2 \begin{pmatrix} 3 \\ 1 \\ 3 \end{pmatrix} = \begin{pmatrix} -6 \\ -2 \\ 2 \end{pmatrix}$$

$$-15 + 1 \cdot 5 - 21$$

$$-14 - 5$$

$$-19 - 21 = -40$$

$$\begin{pmatrix} -5 \\ 1 \\ 5 \\ -7 \end{pmatrix} = \begin{pmatrix} -6 \\ -2 \\ 2 \\ -6 \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 3 \\ 3 \\ -1 \end{pmatrix} = v_2 \quad \begin{matrix} -7+6 \\ = -1 \end{matrix}$$

$$v_3 = x_3 - \frac{x_3 \cdot v_1}{v_1 \cdot v_1} \cdot v_1 + \frac{x_3 \cdot v_2}{v_2 \cdot v_2} \cdot v_2$$

Blah blah blah machine

one go at this

if want orthogonal

do

$$\frac{1}{\|v\|} \cdot v$$

$$\frac{1}{\sqrt{v_1^2 + v_2^2}} \cdot$$