

For $\lambda_2 \approx 11.05$

formula = $(A - \lambda I)$

$$A - 11.05I \Rightarrow \begin{bmatrix} 4-11.05 & 8 & -2 & -2 \\ -2 & -9-11.05 & -2 & -4 \\ 0 & 10 & 5-11.05 & -10 \\ 1 & 13 & -14 & -13-11.05 \end{bmatrix}$$

$$= \begin{bmatrix} -7.05 & 8 & -1 & -2 \\ -2 & -20.05 & -2 & -4 \\ 0 & 10 & -6.05 & -10 \\ 1 & -13 & -14 & -24.05 \end{bmatrix}$$

vector = $(A - \lambda I)x = 0$

$$= \begin{bmatrix} -7.05 & 8 & -1 & -2 \\ -2 & -20.05 & -2 & -4 \\ 0 & 10 & -6.05 & -10 \\ 1 & -13 & -14 & -24.05 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

Let use equation 3.

$$10x_2 - 6.05x_3 - 10x_4 = 0 \Rightarrow x_2 = 0.605x_3 + x_4$$

Let's replace x_2 in equation 1

$$-7.05x_1 + 8(0.605x_3 + x_4) - x_3 - 2x_4 = 0$$

$$-7.05x_1 + 4.84x_3 + 8x_4 - x_2 - 2x_4 = 0$$

$$-7.05x_1 + 3.84x_3 + 6x_4 = 0$$

$$x_1 = \frac{3.84x_3 + 6x_4}{7.05}$$

pick $x_4 = 0.5$, $x_3 = -0.8$

$$x_2 =$$

$$x_1 = \frac{3.84(0.5) + 6(-0.8)}{7.05}$$

$$x_1 = 0.408$$

$$x_2 = 0.6x_3 + x_4$$

$$x_2 = 0.6(0.5) + -0.8$$

$$x_2 = -0.49$$

$$\vec{Y}_2 = \begin{bmatrix} 0.408 \\ -0.49 \\ 0.8 \\ 0.5 \end{bmatrix}$$