Control Week 4:

1. $A = \begin{pmatrix} -2 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 3 & -1 \end{pmatrix}$ 3×3

$B = \begin{pmatrix} 0 & 1 \\ 1 & 0 \\ 0 & 1 \end{pmatrix}$ 3×2

$W_r = \begin{bmatrix} B & AB & A^2 B \end{bmatrix}$ 3×6

Not full rank so not controllable

2. Yes

3. $C = \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix}$ 2×3

$W_0 = \begin{pmatrix} C \\ CA \\ CA^2 \end{pmatrix}$ 6×3 Not observable

4. Yes