

MECH 6300-HW 3

3) i) $A = \begin{bmatrix} 1 & 0 & 0 \\ 10 & 2 & 0 \\ 0 & 5 & 4 \end{bmatrix}$ $J = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 4 \end{bmatrix}$

$\lambda_1 = 1$
 $\lambda_2 = 2$
 $\lambda_3 = 4$

ii) Jordan Form Method:

$(A - 1I)q_1 = 0$ $\begin{bmatrix} 0 & 0 & 0 \\ 10 & 1 & 0 \\ 0 & 5 & 3 \end{bmatrix} x_1 = 0$ $0 + 0 + 0 = 0$ $10a + b + 0 = 0$ $0 + 5b + 3c = 0$ $q_1 = \alpha \begin{pmatrix} \frac{1}{10} \\ -1 \\ \frac{5}{3} \end{pmatrix}$	$(A - 2I)q_2 = 0$ $\begin{bmatrix} -1 & 0 & 0 \\ 10 & 0 & 0 \\ 0 & 5 & 2 \end{bmatrix}$ $a = 0$ $5b + 2c = 0$ $q_2 = \alpha \begin{pmatrix} 0 \\ 1 \\ -\frac{5}{2} \end{pmatrix}$	$(A - 4I)q_3 = 0$ $\begin{bmatrix} -3 & 0 & 0 \\ 10 & -2 & 0 \\ 0 & 5 & 0 \end{bmatrix}$ $a = 0$ $10a - 2b = 0$ $b = 0$ $c = \text{any}$ $q_3 = \alpha \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}$
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$$Q = [q_1, q_2, q_3] = \begin{bmatrix} \frac{1}{10} & 0 & 0 \\ -1 & 1 & 0 \\ \frac{5}{3} & -\frac{5}{2} & 1 \end{bmatrix}$$