

MECH 6300-HW3

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

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

ii) Laplace Method:

$$(sI - A) = \begin{bmatrix} s-1 & 0 & 0 \\ -10 & s-2 & 0 \\ 0 & -5 & s-4 \end{bmatrix}$$

$$\Delta(s) = (s-1)(s-2)(s-4)$$

$$(sI - A)^{-1} = \begin{bmatrix} \frac{1}{s-1} & 0 & 0 \\ \frac{10}{(s-1)(s-2)} & \frac{1}{s-2} & 0 \\ \frac{50}{(s-1)(s-2)(s-4)} & \frac{5}{(s-2)(s-4)} & \frac{1}{s-4} \end{bmatrix}$$

∴ expand for each λ^{-1}

$$e^{At} = \mathcal{L}^{-1}\{(sI - A)^{-1}\}$$