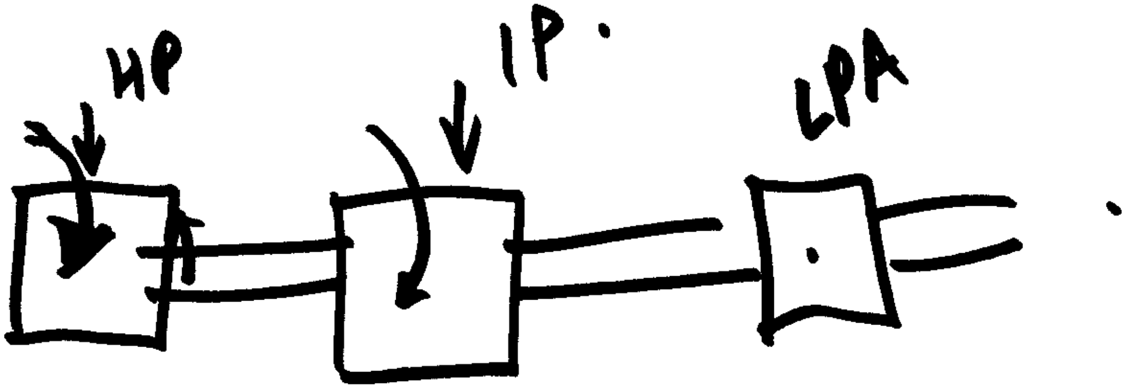
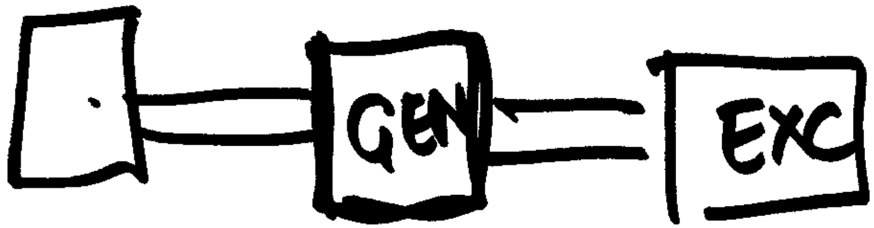
Prof. A.M. Kulkarni
Lec.No. 42
Date: 20/10/10



$$\frac{d\delta_{HP}}{dt} = \omega_{HP} - \omega_0 . \qquad \frac{d\delta_{IP}}{dt} = \omega_{IP} - \omega_0 .$$

$$\frac{2H_{HP}}{\omega_B}\frac{d\omega_{HP}}{dt} = \underline{T_{HP}} - \underline{K_{HP-IP}(\delta_{HP} - \delta_{IP})} .$$

$$\frac{2H_{IP}}{\omega_B}\frac{d\omega_{IP}}{dt} = T_{IP} + \underline{K_{HP-IP}}(\delta_{HP} - \delta_{IP}) - \underline{K_{IP-LPA}(}\delta_{IP} - \delta_{LPA})$$



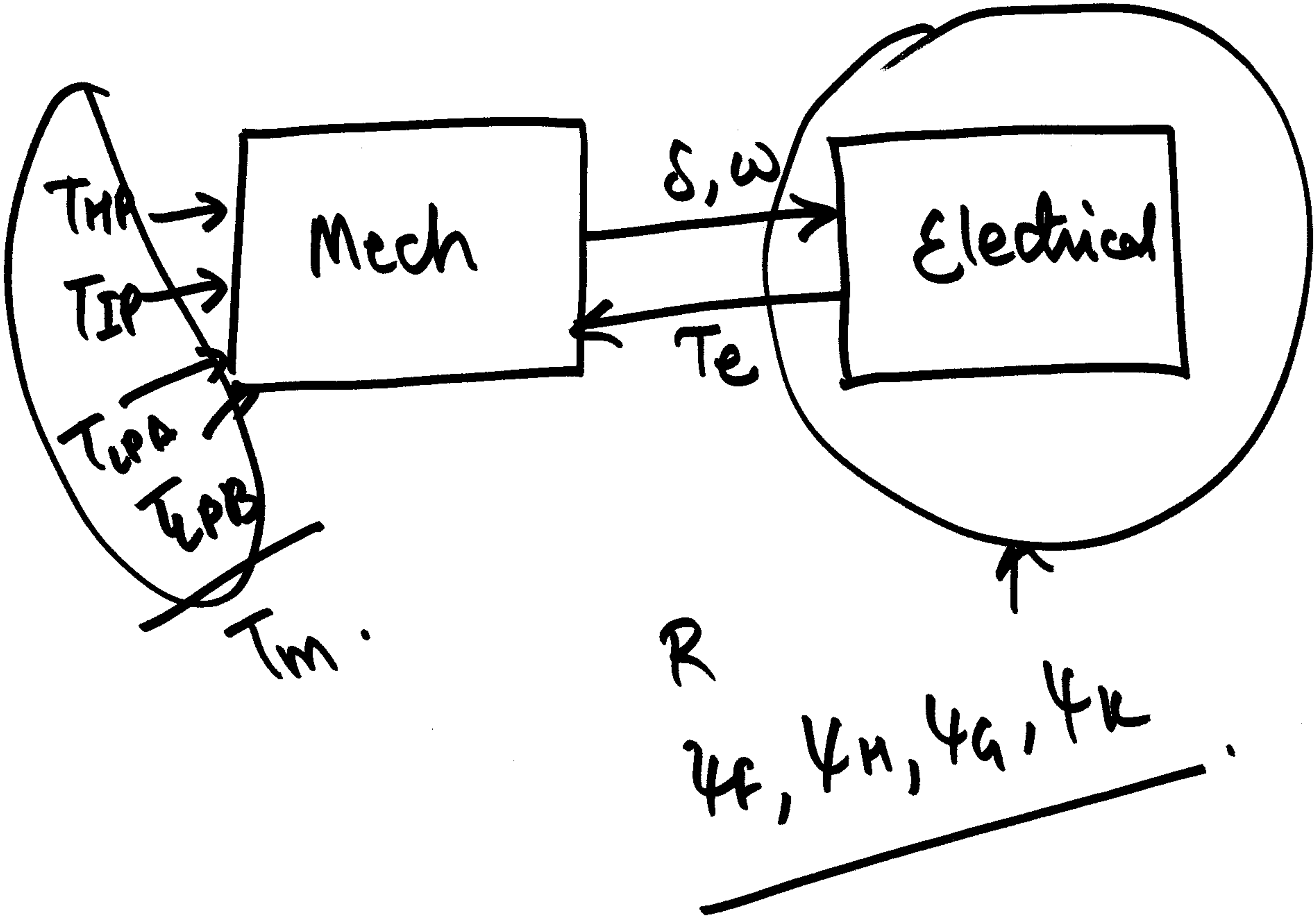
$\delta - \omega$

$$
\begin{cases}
\dfrac{d\delta}{dt} = \omega - \omega_0 \\[2ex]
\dfrac{2H_G}{\omega_B}\dfrac{d\omega}{dt} = -K(\delta - \delta_{exc}) + K(\delta_{LPB} - \delta_G) - T_e \leftarrow \underline{\underline{0}}
\end{cases}
$$

12 states

$$\frac{d}{dt}\begin{bmatrix}\delta_{HP}\\ \vdots\\ \delta_{EXC}\\ \omega_{HP}\\ \vdots\\ \omega_{EXC}\end{bmatrix} = A\begin{bmatrix}\delta_{HP}\\ \vdots\\ \vdots\\ \omega_{EXC}\end{bmatrix}$$

eigen(A)


THP
TIP
TLPA
TLPB
Tm.
Mech
δ, ω
Te
Electrical
R
ψf, ψH, ψG, ψK

$x_L = 0.7$

$X_C = 0.3 \rightarrow \frac{1}{b_c}$

$b_c = \frac{1}{0.3}$

$x_L = x_{L\,pu} \times Z_{base}$

$b_c = b_{c\,pu} \times Y_{base}$

$Y = \frac{1}{Z_{base}}$

$$\omega_n = \frac{1}{\sqrt{LC}}$$

$$= \frac{\omega_B}{\sqrt{\omega_B \cdot L \cdot \omega_B \cdot C}}$$

$$\omega_n = \frac{\omega_B}{\sqrt{x_L \cdot b_c}}$$

$$\omega_n = \frac{\omega_B}{\sqrt{x_l \cdot b_c}}.$$

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$$\omega_n = \frac{\omega_B}{\sqrt{0.7 \times 1/0.3}}.$$

$$= \omega_B \sqrt{\frac{0.3}{0.7}}.$$

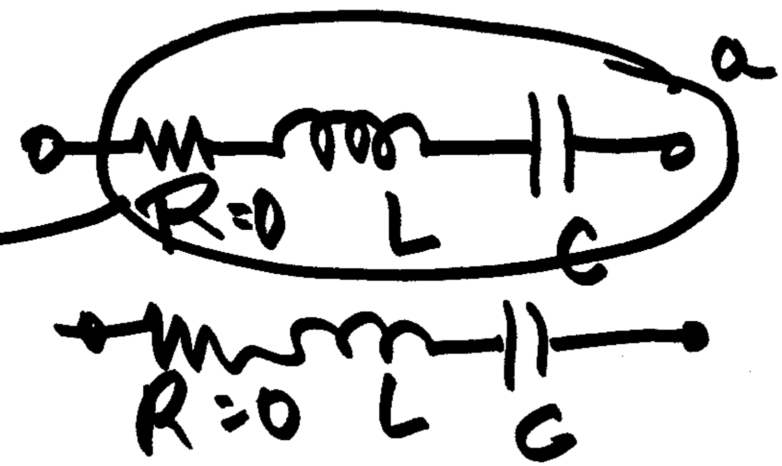
$20.13 \simeq 60 - 40.$

$99.27 \simeq 60 + 40$

$(60 + j\Omega)$

$(60 - j\Omega).$

D-Q



$\omega_0 = \dfrac{1}{\sqrt{LC}}$

λ

$\lambda \pm j\omega_d$!

a-b-c | D-Q

$\lambda \rightarrow \pm j\omega_n$

$\lambda \pm j\omega_B$

$\sigma + j\omega_n \pm j\omega_B$

$\sigma - j\omega_n \pm j\omega_B$

4

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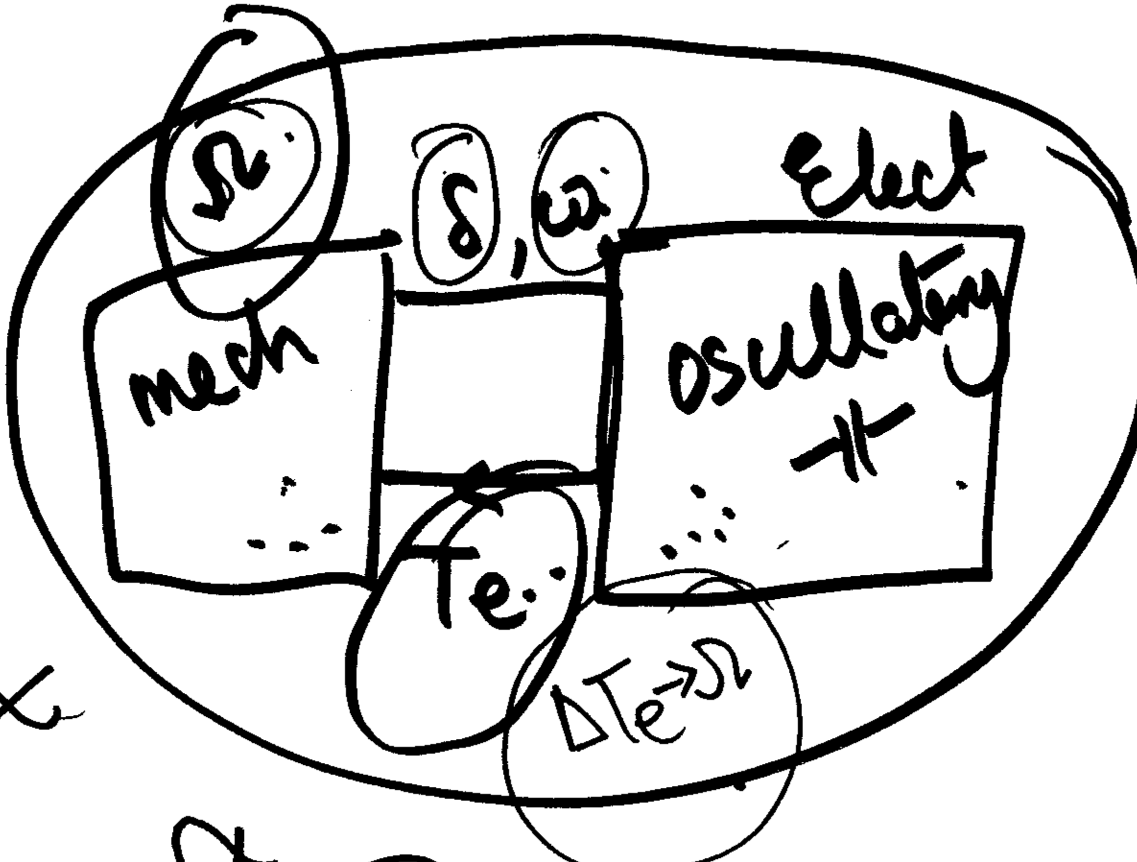
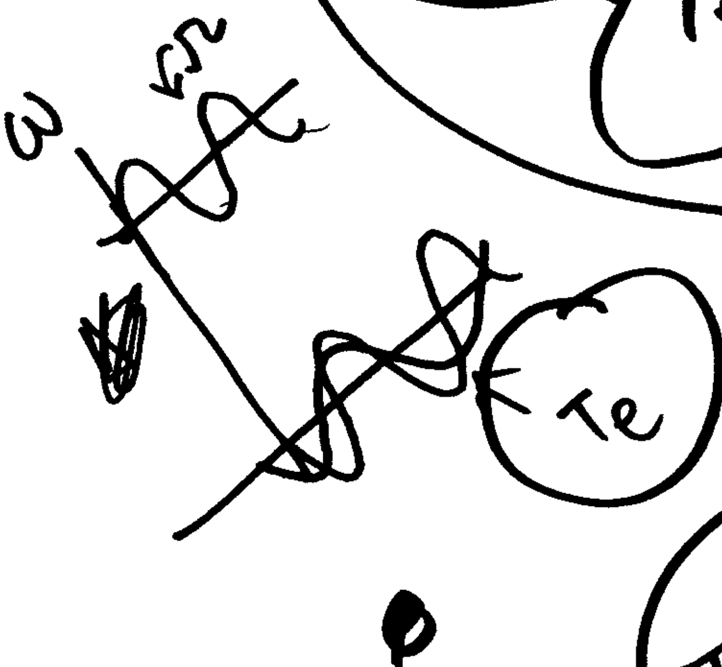
39.27



$i_d \; i_q, \delta,$



$$T_e = \psi_d i_q - \psi_q i_d.$$

$$\Delta T_e(t) \propto -\Delta\omega(t)$$

$$\Delta \dot{x}_m = A_m \Delta x_m + B_m \underline{\underline{\Delta T_e}}.$$

$$\Delta T_e = \psi_{d0} \Delta i_q + \Delta \psi_d \cdot i_{q0} - \psi_{q0} \Delta i_d - \Delta \psi_q \, i_{d0}.$$

$$= C_e \cdot \Delta x_e$$

$$\Delta \dot{x}_e = A_e \Delta x_e + B_e \begin{bmatrix} \Delta \omega \\ \Delta \delta \end{bmatrix}$$

$$\begin{bmatrix} \Delta \dot{x}_m \\ \Delta \dot{x}_e \end{bmatrix} = \begin{bmatrix} \quad & \quad \end{bmatrix} \begin{bmatrix} \Delta x_m \\ \Delta x_e \end{bmatrix}$$

$\underline{\underline{C \, x_m}}$.

ΔT_{1P},

$\frac{5}{0.2}$

25 Hz.

$\frac{25 \times 6.28}{160 \text{ rad/s}}$