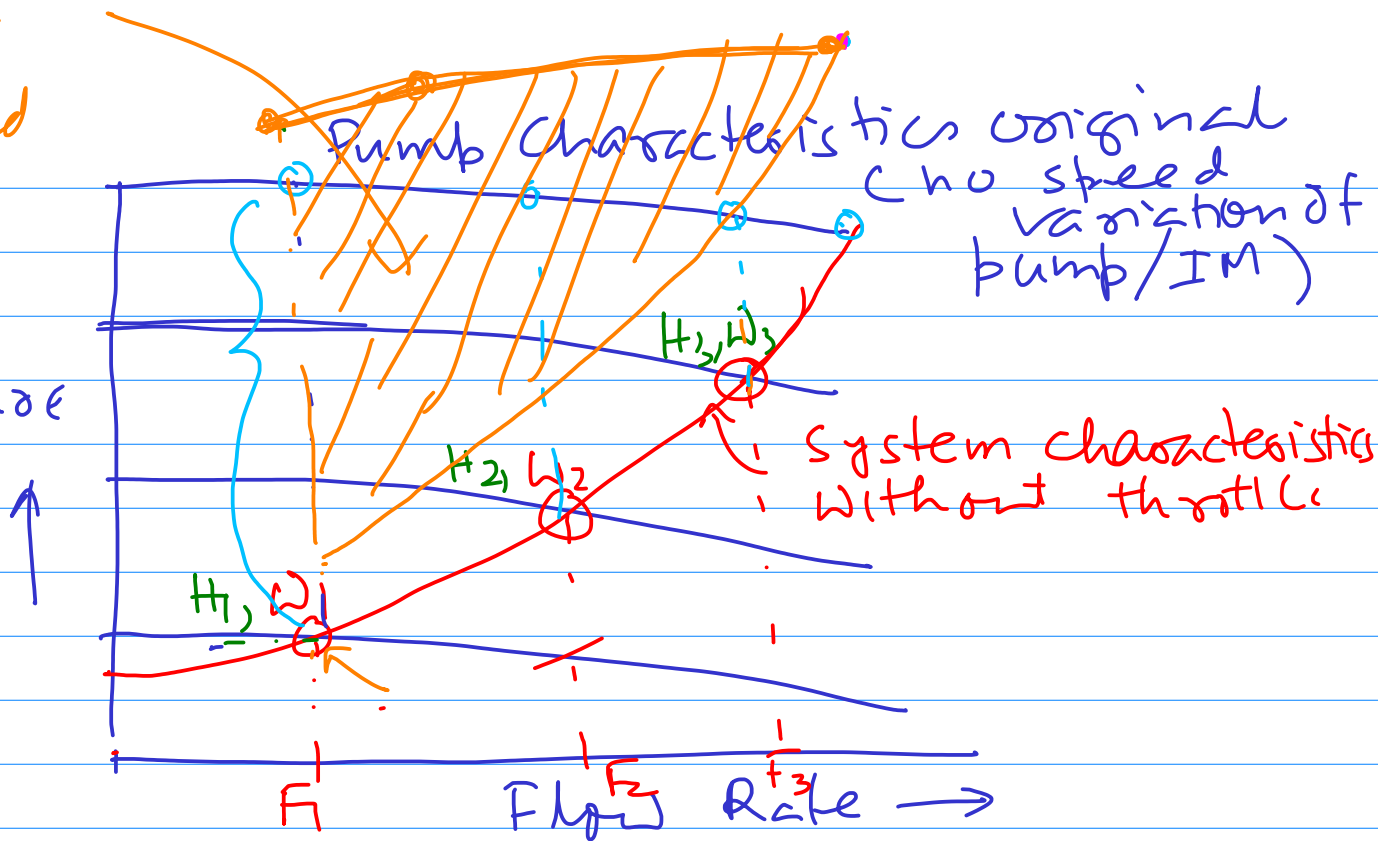
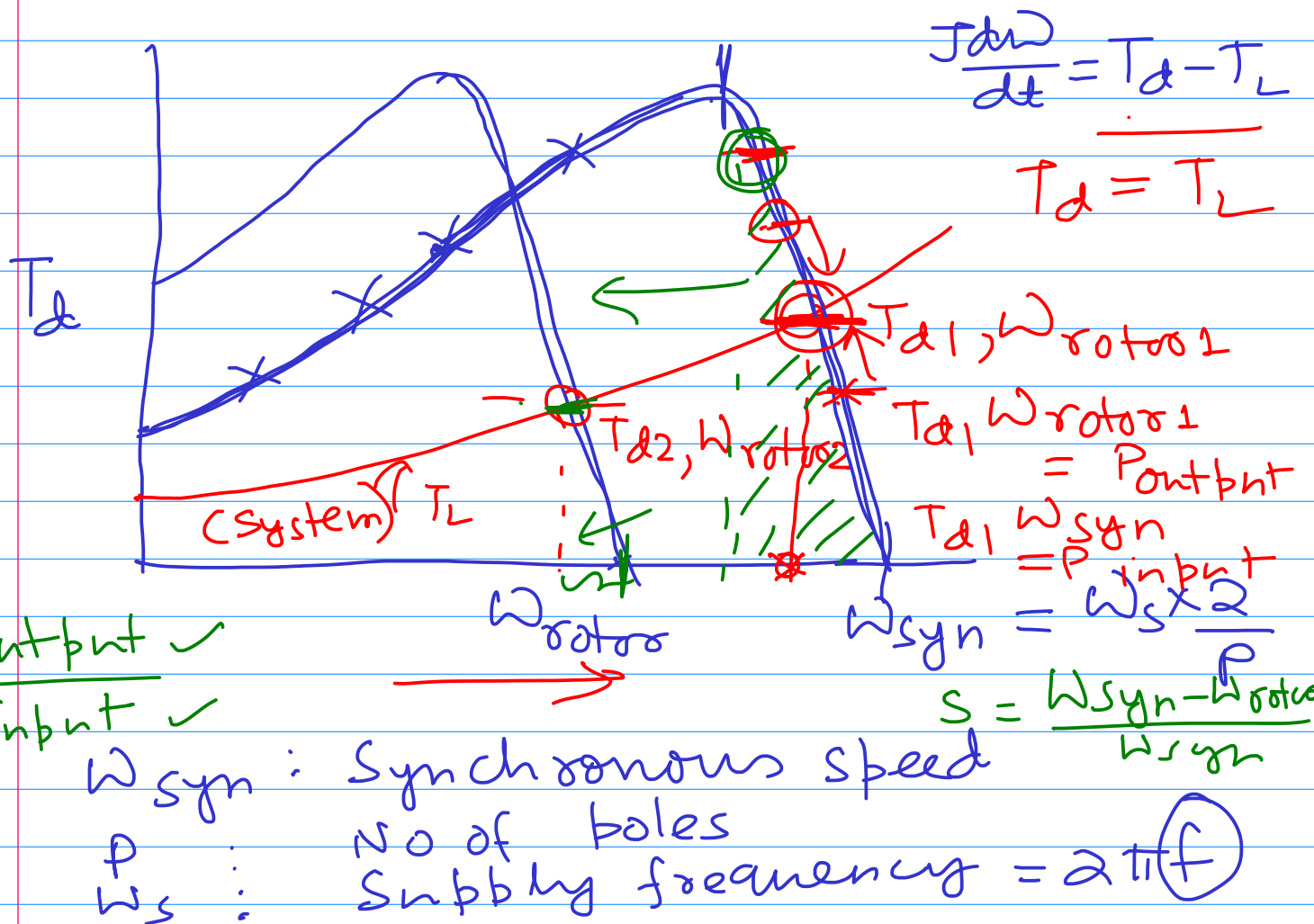


Power saved

Pressure

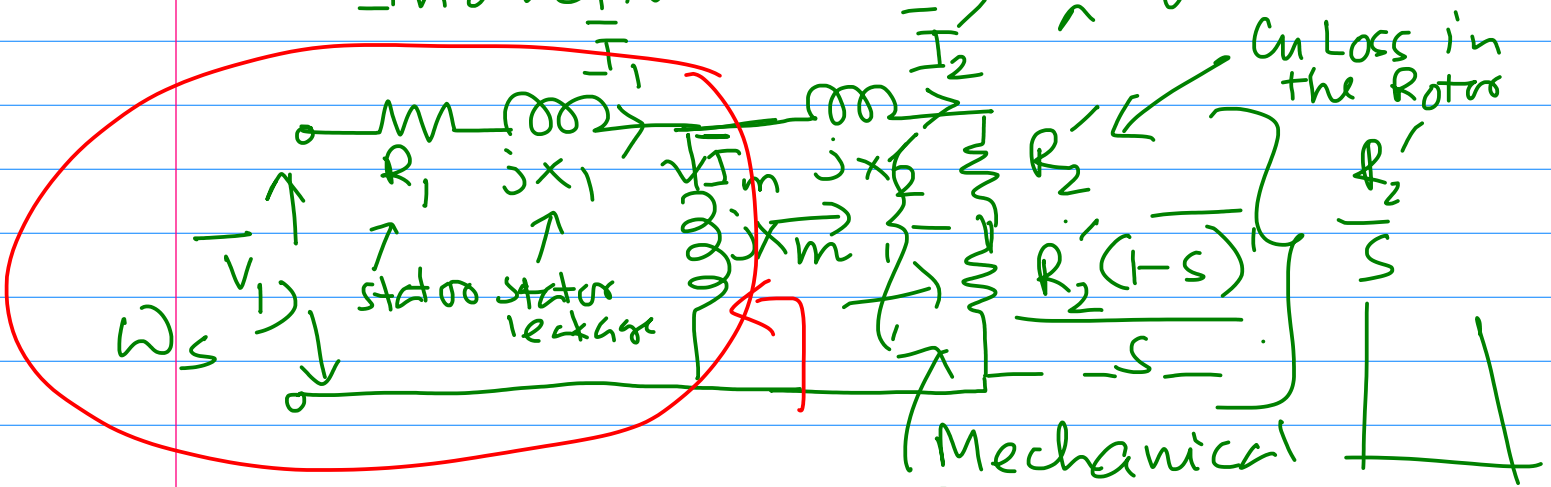


$$\text{Power} \propto \text{Pressure} \times \text{Flow Rate} \\ = \text{Torque} \times \text{Speed (mech)}$$



Peg Phase

Induction Machine Equivalent Circuit



$$s = \text{slip} = \frac{\omega_{\text{syn}} - \omega_{\text{rotor}}}{\omega_{\text{syn}}}$$

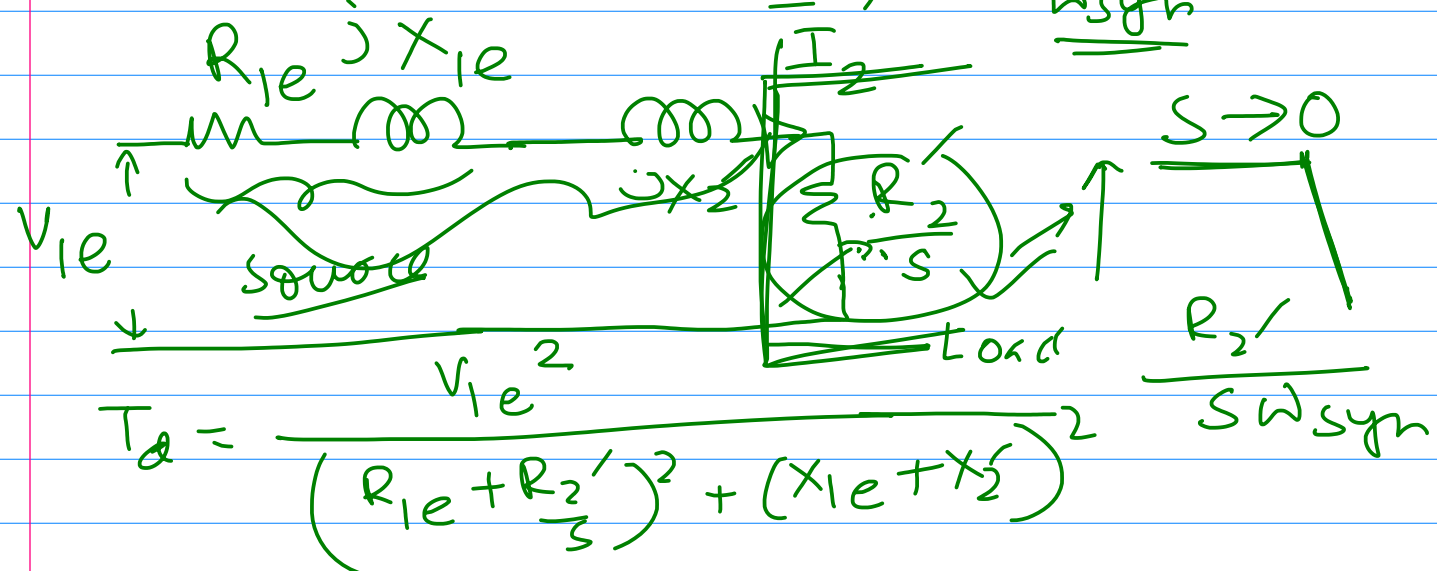
$$\omega_s = \omega_{\text{syn}} \times \frac{P}{2}$$

Power Output = $I_2'^2 R_2' \frac{(1-s)}{s}$

per phase

$$T_d = \frac{I_2'^2 R_2' (1-s)}{s \omega_{\text{rotor}}} = \frac{I_2'^2 R_2' (1-s)}{s (1-s) \omega_{\text{syn}}}$$

$$(R_1 + jX_1) \parallel jX_m = R_{1e} + jX_{1e} = \frac{I_2'^2 R_2' / s}{\omega_{\text{syn}}}$$



$$T_d = \frac{V_{1e}^2}{(R_{1e} + \frac{R_2'}{s})^2 + (X_{1e} + X_2')^2} \frac{R_2'}{s \omega_{\text{syn}}}$$

For maximum torque development

$$\frac{R_2'}{s_{max}} = \sqrt{(R_{1e})^2 + (X_{1e} + X_2')^2}$$

$$s_{max} = \frac{R_2'}{\sqrt{R_{1e}^2 + (X_{1e} + X_2')^2}}$$

$$T_{max} = \frac{1}{\omega_{syn}} \frac{V_{1e}^2}{R_{1e} + \sqrt{R_{1e}^2 + (X_{1e} + X_2')^2}}$$

