

11.19 Correction to b) and c)

b) During Fault:

$$P_e = \frac{V_{Th} E'}{X_{Th}} \sin \delta$$

$$X_{Th} = 0.0375 + 0.09 // 0.03 \\ = 0.0625$$

$$V_{Th} = 1 \angle 0 \left(\frac{0.03}{0.09 + 0.03} \right) \\ = 0.25$$

$$\begin{cases} \ddot{\delta} = \omega - \omega_{syn} \\ \dot{\omega} = \frac{\omega_{syn}}{2H W_{pu}} (P_{apu} = \frac{377}{2 \times 20 \times 1} (4 - \frac{0.25 \times 1.053}{0.0625} \sin \delta - \frac{0.1}{377} \dot{\delta})) \end{cases}$$

c) Use δ and ω equations from above

$$\delta_{t+\Delta t} = \delta_t + \Delta t (\omega - 377)$$

$$\omega_{t+\Delta t} = \omega_t + \Delta t \left(\frac{377}{2 \times 20 \times 1} \left(4 - \frac{0.25 \times 1.053}{0.0625} \sin \delta - \frac{0.1}{377} (\omega - 377) \right) \right)$$