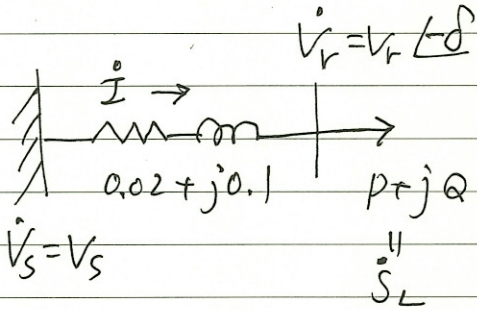
NO. 1

DATE

# CH.10 解答

(1) 母線電圧をベース値とするから、

$V_S = 1.0$ pu




① 力率 0.9 より

$$|\dot{S}_L| = \frac{P}{0.9} = \frac{10}{9} \text{ pu}$$

$$Q = \sqrt{|\dot{S}_L|^2 - P^2} = \sqrt{\left(\frac{10}{9}\right)^2 - 1.0^2} = 0.484 \text{ pu}$$

$\dot{S}_L = \dot{V}_r \dot{I}^*$ と $\dot{I} = \dfrac{\dot{V}_S - \dot{V}_r}{0.02 + j0.1}$ より

$$1 + j0.484 = \frac{\dot{V}_r - V_r^2}{0.02 \mp j0.1} \Rightarrow (1 + j0.484)(0.02 \mp j0.1)$$

$$= V_r \cos\delta - jV_r \sin\delta - V_r^2$$

より

$$0.02 + 0.048 = V_r \cos\delta - V_r^2, \quad 0.09 = V_r \sin\delta$$

$$\Rightarrow (V_r^2 + 0.068)^2 + 0.09^2 = V_r^2 \Rightarrow V_r^4 - 0.8632 V_r^2 + 0.0128 = 0$$

$$\therefore V_r^2 = \frac{0.8632 + \sqrt{0.8632^2 - 4 \times 0.0128}}{2} \simeq 0.848$$

$$\Rightarrow V_r = 0.92 \text{ pu} = 0.92 \times \frac{154}{\sqrt{3}} = \cancel{81.88} \text{ kV} \quad 141.7$$

② (10.14) を用いる.

$$Z \simeq X = 0.1 \text{ pu}, \quad C = \frac{V_r^2}{Z} \simeq \frac{0.92^2}{0.1} = 8.464$$

$$\therefore \frac{\Delta V_{r,P}}{\Delta V_{r,Q}} \simeq \frac{P}{C} + \frac{R}{Z} = \frac{1}{8.464} + \frac{0.02}{0.1} = 0.318$$