

#2 تحالفه

$$\begin{aligned} Z &= 0.3 + j0.6 \frac{\Omega}{\text{km}} \rightarrow Z' = 400 (0.3 + j0.6) = 120 + j240 \\ Y &= 0 + j4 \times 10^{-6} \frac{\text{S}}{\text{km}} \rightarrow Y' = 400 (j4 \times 10^{-6}) = j400 \times 10^{-6} \\ L &= 400 \text{ km} \\ \text{أين } A, B? \end{aligned}$$

$$\begin{cases} Z = 0.6708 \angle 63.43^\circ \\ Y = 10^{-6} \angle 90^\circ \end{cases}$$

$$\gamma L = \sqrt{ZY} \times L = 400 \sqrt{0.6708 \times 10^{-6}} \angle \frac{63.43^\circ + 90^\circ}{2} = 0.327 \angle 76.71^\circ = 0.083 + j0.316$$

$$Z_c = \sqrt{\frac{Z}{Y}} = \sqrt{\frac{0.6708}{10^{-6}}} \angle \frac{63.43^\circ - 90^\circ}{2} = 819 \angle -13.28^\circ = 619 - j536$$

$$\cosh(\gamma L) = \cosh(0.083) \cosh(0.316) + j \sinh(0.083) \sinh(0.316) = 0.9538 + j0.025$$

$$\sinh(\gamma L) = \sinh(619) \cosh(-536) + j \cosh(619) \sinh(-536) = -5.88 \times 10^{266} - j1.5 \times 10^{267}$$

$$A = \cosh \gamma L = 0.9538 + j0.025 = 0.9541 \angle 1.5^\circ, B = Z_c \sinh \gamma L = -1.168 \times 10^{270} - j6.13 \times 10^{269} = 1.319 \times 10^{270} \angle -152.30^\circ$$

$$\Rightarrow S_{3\phi} = 40 \text{ MVA}, V_{R3\phi} = 230 \text{ kV}, \cos \phi = 0.8 \Rightarrow V_s = ?$$

$$V_{R1\phi} = \frac{V_{R3\phi}}{\sqrt{3}} = \frac{230 \times 10^3}{\sqrt{3}} = 132790 \angle 0^\circ$$

$$I_R = \frac{S}{\sqrt{3} V_{R3\phi}} \angle -\cos^{-1}(0.8) = \frac{40 \times 10^6}{\sqrt{3} \times 230} \angle -36.87^\circ = 1004 \angle -36.87^\circ = 678 + j740 \text{ A}$$

$$\Rightarrow V_s = A V_R + B I_R = [(0.9541 \angle 1.5^\circ) \times (132790 \angle 0^\circ)] + [(1.319 \times 10^{270} \angle -152.30^\circ) \times (1004 \angle -36.87^\circ)]$$

$$\Rightarrow V_s = -3.38 \times 10^{272} - j1.27 \times 10^{273} = 1.32 \times 10^{273} \angle -104.80$$

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معانی حد اکثر توان به پاری رسد $\theta - \phi = 0$

$$P_R^{\max} : \rightarrow \theta = \phi$$

$$P_R^{\max} = \frac{|V_R| |V_s|}{|B|} \cos(\beta - \phi) = \frac{|A| |V_R|^2}{|B|} \cos(\beta - \alpha)$$

$$= \frac{132790 \times 1.32 \times 10^{273}}{1.319 \times 10^{270}} - \frac{0.9541 \times (132790)^2}{1.319 \times 10^{270}} \cos(0.0008 - 0.0002)$$

$$\approx 13280674 \text{ W}$$

$$\chi_L = 0.083 + j0.316 \rightarrow \chi = 0.0002 + j0.0008 = \alpha + j\beta \quad \begin{cases} \alpha = 0.0002 \\ \beta = 0.0008 \end{cases}$$