Parte II

a) $\pi \approx 0 \Rightarrow$ linha sem perdas

$$\begin{bmatrix} A & B \\ C & D \end{bmatrix}$$

$A = D = \cos(\beta d) = 0.9498\ \Omega$

$B = j \cdot Z_0 \cdot \sin(\beta d) = j 88.03\ \Omega$

$C = j \frac{1}{Z_0} \sin(\beta d) = j 1.11\ mS$

$d = 300\ Km$

$\beta = \omega\sqrt{LC} = 1.06 \times 10^{-3}$

$Z_0 = \sqrt{\frac{L}{C}} = 281.366$

b) $\begin{bmatrix} V_2 \\ I_2 \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \begin{bmatrix} V_\pi \\ I_\pi \end{bmatrix} \Leftrightarrow \begin{bmatrix} V_m \\ I_2 \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \begin{bmatrix} V_3 \\ 0 \end{bmatrix}$

$\Downarrow$

$V_m = A V_3 \Rightarrow V_3 = 231.6\ kV$ (comporta)

$I_2 = C V_3$

V: $V_3 \propto A^{-1} V_2$

V: $I_2 \propto C V_3$

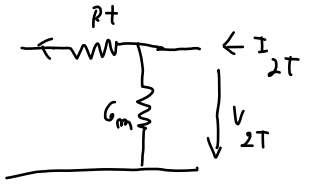
F: $\cos\left(\frac{d}{2} \cdot \beta\right) \cdot V_m = V\frac{d}{2}$

c) $V_{2T} = 220\ kV$

$I_{2T} = 148.59\ A$

$P_{cc} = R_t\ I_m^2 \Leftrightarrow R_t = \frac{P_{cc}}{I_m^2} = 5 \times 10^{-3}\ \mu$

$P_0 = G_m V_m^2 \Leftrightarrow G_m = \frac{P_0}{V_m^2} = 2 \times 10^{-3}\ \mu$




$P_{fe} = G_m \cdot V_{2T}^2 = 2 \times 10^{-3} \cdot 1^2 = 400\ kW$

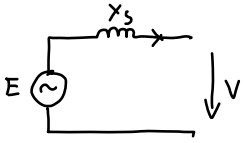
$I_f = G_m V_{1T} = 2 \times 10^{-3}\ \mu$

$I_{cm} = I_{2T} - I_f = 0.2811\ \mu$

$P_{cm} = R_t \cdot I_{cm}^2 = 5 \times 10^{-3} \cdot (0.2811)^2 = 79.017\ kW$

$I_{cm} = I_{1T} = 0.2811 \cdot \frac{S_b}{\sqrt{3} \cdot 10K} = 3.245\ kA$

d)




$E = V + j X_s I \rightarrow E = 1 + j \cdot 1.2 \cdot 0,2811 \Rightarrow |E| = 1.055$

$V = V_{1T}$ $X_s = 1,2\ \mu$

$I = I_\pi$