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## TUGAS 2 SISTEM KOMUNIKASI

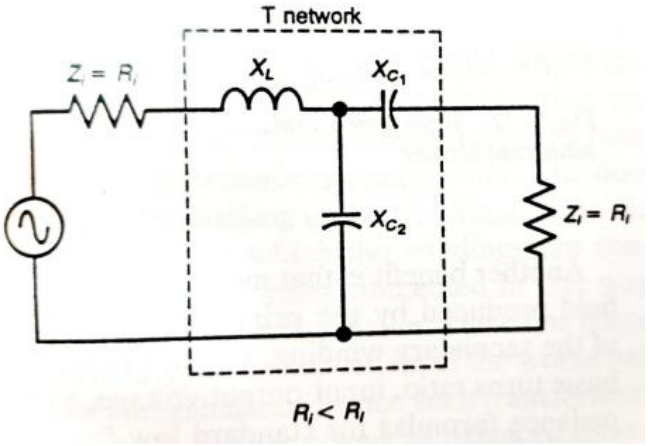
Tentukan rangkaian penyesuai impedansi LCC Network untuk menyesuaikan impedansi sumber 5Ω ke beban 50Ω pada frekuensi 100 MHz. Asumsikan Q rangkaian= 10

## JAWAB

Diketahui:

$R_i = Z_i = 5\ \Omega$
$R_l = Z_l = 50\ \Omega$
$f = 500$ MHz
$Q = 10$

Menggunakan rangkaian LCCT Network




$$X_L = Q \times R_i = 10 \times 5 = 50\ \Omega$$

$$X_{C1} = R_l\sqrt{\frac{R_i(Q^2+1)}{R_l} - 1} = 50\sqrt{\frac{5(101)}{50} - 1}$$

$$X_{C1} = 150.83\ \Omega$$

$$X_{C2} = \frac{R_i(Q^2+1)}{Q} \times \frac{1}{1 - \frac{X_{C1}}{QR_l}}$$

$$X_{C2} = \frac{5(101)}{10} \times \frac{1}{1 - \frac{150.83}{500}} = 72.31\ \Omega$$

Dengan demikian dapat kita cari besarnya L dan C

$$L = \frac{X_L}{\omega} \rightarrow L = \frac{50}{2\pi(100 \times 10^6)} = 7.95 \times 10^{-8}\ \text{H}$$

$$C_1 = \frac{1}{\omega X_{C1}} \rightarrow C_1 = \frac{1}{2\pi \times 100 \times 10^6 \times 150.83} = 1.05 \times 10^{-11}\ \text{F}$$

$$C_2 = \frac{1}{\omega X_{C2}} \rightarrow C_2 = \frac{1}{2\pi \times 100 \times 10^6 \times 72.31} = 2.2 \times 10^{-11}\ \text{F}$$

Hasil akhir:

$Z_i = 5\ \Omega$
$Z_l = 50\ \Omega$
$L = 7.95 \times 10^{-8}$ H
$C_1 = 1.05 \times 10^{-12}$ F
$C_2 = 2.2 \times 10^{-12}$ F