数学作业纸

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2.7

2.27

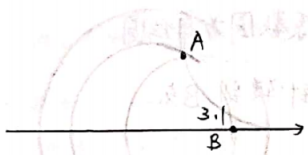
解：$\lambda = \frac{c}{f} = 0.1\ m$.

$\bar{z}_L = \frac{z_L}{z_0} = 0.75 + j\ \Omega$

① 由阻抗圆图可确定 A 位置.

由A可确定等反射系数圆，与正实轴交于 B.

可读出 ρ.



$\rho = 3.1$

② $10cm = \lambda$

$\Gamma(10cm) = \Gamma_2 = \frac{\rho - 1}{\rho + 1}$

$|\Gamma_2| = \frac{\rho-1}{\rho+1} = 0.51$

A点电标度 $\bar{l}_A = 0.146$

$\therefore \phi_2 = \frac{0.25\lambda - 0.146\lambda}{0.5\lambda} = 0.416\pi$.

$\therefore \Gamma(10cm) = \Gamma_2 = 0.51 e^{j0.416\pi}$

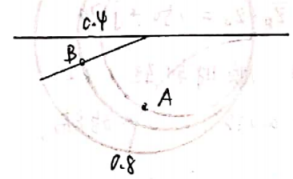
③ $2.5cm = \frac{\lambda}{4}$.

$z_{in}(\frac{\lambda}{4}) = \frac{z_0^2}{z_L} = 48 - j64\ \Omega$.

2-31.

①解：$\bar{z}_L = \frac{z_L}{z_0} = 0.4 - j0.8$

$\bar{l}_A = 0.384$.



$\bar{l}_B = 0.384 + 0.11 = 0.494$.

$\bar{z}_B = 0.23 - j0.03$

$z_B = \bar{z}_B \cdot z_0 = 11.5 - j1.5\ \Omega$

②解：

$\bar{z}_{in} = \frac{z_{in}}{z_0} = 0.6 + j0.2\ \Omega$

$\bar{l}_A = 0.047$.

$l = 0.31$. (逆时针)

$\bar{l}_B = 0.5 + (0.047 - 0.31) = 0.237$.

$\bar{z}_B = 1.75 + j0.18$.

$\therefore z_B = \bar{z}_B \cdot z_0 = (87.5 + j9)\ \Omega$

③解：$\bar{z}_L = 0.4 + j0.8$

想 $\bar{z}_L$ → 阻抗圆 → 等反射系数圆

读出 ρ ← 正实轴交点、B (波腹)

负实轴交点、C (波节)

$\rho = 4.3$.

$\bar{l}_{min} = \bar{l}_C - \bar{l}_A = 0.385$

$l_{min} = \bar{l}_{min} \cdot \lambda = 0.385\lambda$

2.32

④解：$\rho = \frac{|U|_{max}}{|U|_{min}} = \frac{\frac{5}{3}}{\frac{1}{3}} \approx 3.85$

$\rho \rightarrow$ 等电阻圆 $\rightarrow$ 等反射系数圆

确定电压波腹点A. $\bar{r}_A = 0.25$

$\bar{r}_B = \bar{r}_A - \bar{r}_{max} = 0.218$.

$\bar{z}_B = 2.50 + j1.7$.

$z_L = \bar{z}_B \cdot z_0 = 250 + j170$

从B到A. 顺时针转 1.82

$\bar{r}_C = 0.038$. C为始端.

$\bar{z}_{in} = \bar{z}_C = 0.28 + j0.22$.

$z_{in} = \bar{z}_C \cdot z_0 = (0.28 + j0.22) \times 100$

$= 28 + j22$

⑤解：$\bar{z}_L = 0.4 - j2.4$.

可通过阻抗圆图确定A位置. $\bar{r}_A = 0.312$.

可确定等反射系数圆，与正实轴交于B

$\bar{r}_B = 0.25$. $\rho = 18$

$|\Gamma_L| = \frac{\rho - 1}{\rho + 1} = 0.89$.

$\phi_L = -\frac{0.312 - 0.25}{0.5} \times 2\pi = -0.248\pi$

$\Gamma_L = 0.89 e^{-j0.248\pi}$.

⑥解：$\bar{Y}_L = Y_L \cdot Z_0 = 1.8 - j0.6$

可由导纳圆图确定A点，与等反射系数圆

$\bar{r}_A = 0.284$.

从A到B. 顺时针转 0.31.

$\bar{r}_B = (0.284 + 0.31) - 0.5 = 0.094$

$\bar{Y}_{in} = \bar{Y}_B = 0.64 + j0.47$.

$Y_{in} = 0.011 + j0.0078$ S.

⑦解：终端短路. A点，对应电标度 $\bar{r}_A = 0.25$

等反射系数圆为单位圆

顺时针转到 B点.

$\bar{r}_B$

$\bar{r}_B = \bar{r}_A + \bar{l}$

得 $\bar{l} = 0.104$

$l = 0.104 + 0.5n$.

⑧解：终端短路 A点，$\bar{r}_A = 0.25$. 与等反射 $\sim$ 为单位圆

$\bar{r}_B = \bar{r}_A + \bar{l} = 0.36$.

读出 $\bar{Y}_{in} = -j1.2$.

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班级： 姓名： 编号： 科目： 第 页

④解：开终端开路，A，$\bar{r}_A=0$

等反射～为单位圆

$\bar{r}_B=\bar{r}_A+\bar{r}=0.11$

读出 $\bar{Y}_{in}=j0.83$.

⑤解：$\bar{Z}_L=0.2-j0.31$

可确定A点等反射系数圆.

~~A点~~

A B与A关于圆心对轴

$\bar{Y}_B=1.47+j2.28$.

$\bar{r}_B=0.201$.

顺时针转到 $\bar{G}=1$ 的交点C/D.

$\bar{r}_C=0.315$

C点：$\bar{r}_C=\bar{r}_B+\frac{d}{\lambda}$.

$d=(\bar{r}_C-\bar{r}_B)\lambda=0.114\lambda$.

$d=(0.114+0.5n)\lambda$.

D点：$d=(\bar{r}_D-\bar{r}_B+0.5)\lambda=0.484\lambda$

$d=(0.484+0.5n)\lambda$.