EE381 HW3

Lewis Collum

Updated: February 16, 2020

2.47

(a) $\Gamma = 0.5\angle 0^\circ$

(b) $\Gamma = 0.62\angle -29.74^\circ$

(c) $\Gamma = 1\angle -53.13^\circ$

(d) $\Gamma = 1\angle 180^\circ$

2.53

(a) $\Gamma = 0.24\angle 75^\circ$

(b) $SWR = 1.65$

(c) $z(0.35\lambda) = 0.61 - j0.05$

(d) $y(0.35\lambda) = 1.65 + j0.05$

(e) $d = 0.105\lambda$

(f) $d(max) = 0.105\lambda$

2.54

(a) $\Gamma = 0.24\angle 76^\circ$

(b) $SWR = 1.64$

(c) $z(0.35\lambda) = 0.61 - j0.02$

(d) $y(0.35\lambda) = 1.64 + j0.06$

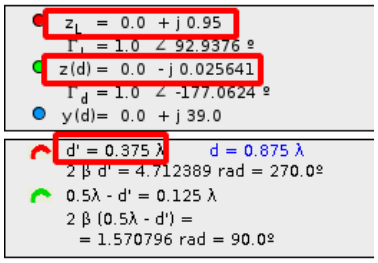
(e) $d = 0.105\lambda$

(f) $d(max) = 0.105\lambda$

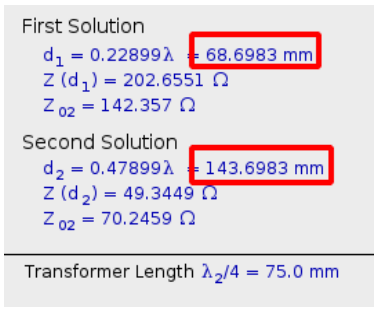
2.58

(a) $Z_L = \boxed{j0.95 \cdot Z_0} = 95\Omega$

(b)



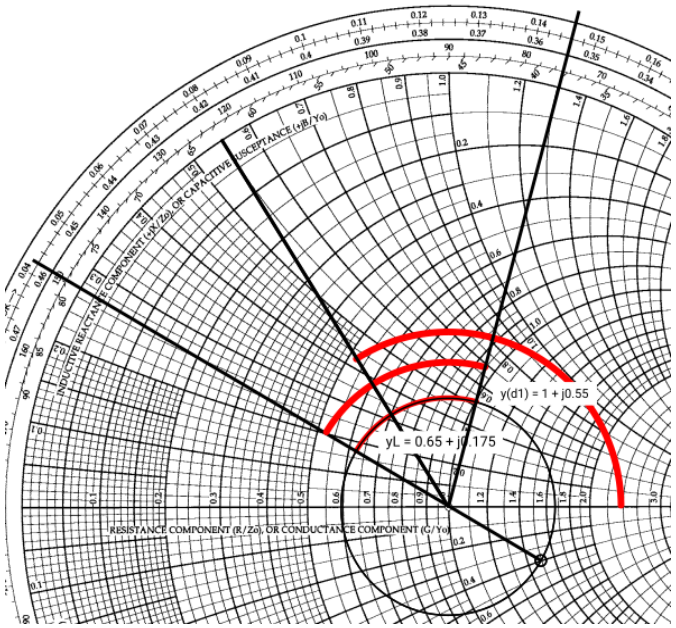
2.65



2.68

Z_L	$(75 - j20)\Omega$
Z_0	50Ω
z_L	$(1.5 - j0.4)\Omega$
y_L	$(0.65 + j1.75)\mho$
d_1	$\boxed{0.104\lambda}$
$y(d_1)$	$(1 + j0.55)\mho$
l_1	$0.25 - 0.08 = \boxed{0.17\lambda}$

Work:



2.72

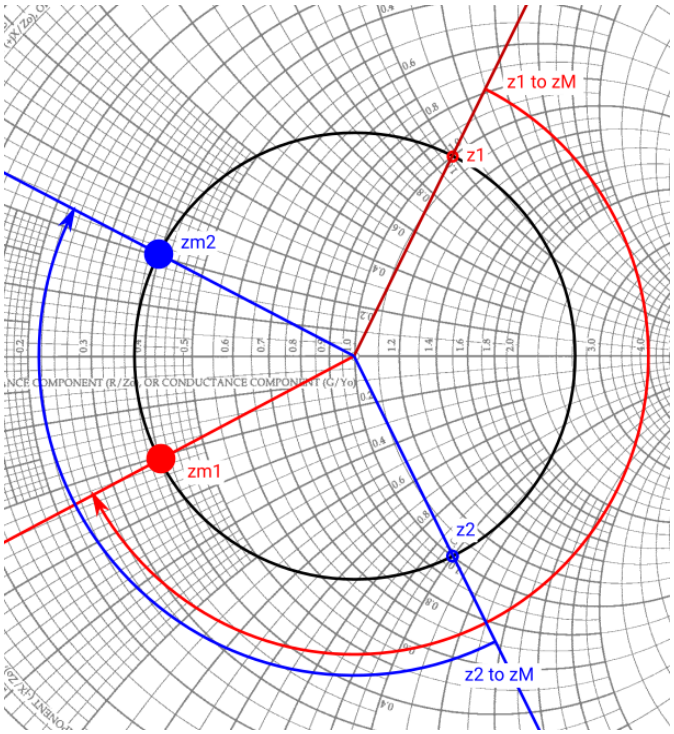
Find z_m

$$z_{m1} = 0.4 - j0.2$$

$$z_{m2} = 0.4 + j0.2$$

$$z_m = z_{m1} \parallel z_{m2} = 0.25 + j0$$

Work:

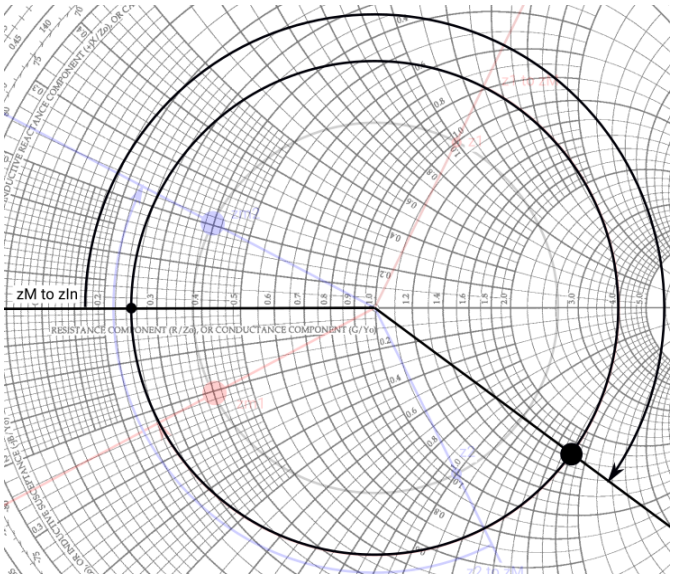


Find Z_{in}

$z_{in} = 1.65 - j1.8$

$Z_{in} = (82.5 - j90)\Omega$

Work:



2.74

$z_L = 25/75 = 0.33\Omega$

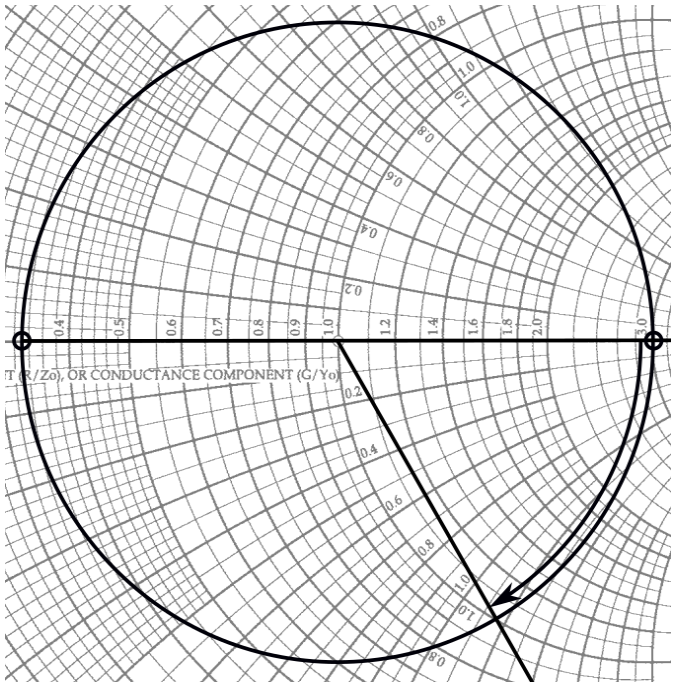
$y_B = (1.0 - j1.15)\mho$

$l = 0.3325\lambda - 0.25\lambda = \boxed{0.0825\lambda}$

$z_B = 1/y_B = (0.43 + j0.5)\Omega$

$Z = Z_B = z_B Z_0 = \boxed{(32.25 + j37.5)\Omega}$

Work:



2.75

$$T = \frac{1\text{m}}{2c/3} = 5\text{ns}$$

$$\Gamma_L = \frac{R_L - Z_0}{R_L + Z_0} = \frac{25 - 50}{25 + 50} = -\frac{1}{3}$$

$$\Gamma_g = \frac{R_g - Z_0}{R_g + Z_0} = \frac{100 - 50}{100 + 50} = \frac{1}{3}$$

$$V_1^+ = V_g \cdot \frac{Z_0}{Z_0 + R_g} = 60 \cdot \frac{50}{50 + 100} = 20\text{V}$$

$$V_1^- = V_1^+ \cdot \Gamma_L = 20 \cdot -\frac{1}{3} = -6.67\text{V}$$

$$V_2^+ = V_1^- \cdot \Gamma_g = 6.67 \cdot \frac{1}{3} = 2.22\text{V}$$

$V_2^- = -0.74\text{V}$

$V_3^+ = 0.25\text{V}$

$V_3^- = -0.083\text{V}$