

$$2b/ \quad Z_{in} = Z_0 \left[\frac{(Z_L \cos \beta l) + (jZ_0 \sin \beta l)}{(Z_0 \cos \beta l) + (jZ_L \sin \beta l)} \right]$$

$$Z_{in} = 50 \times \left[\frac{(40 + j30) \cos(0.8\pi) + (j50) \sin(0.8\pi)}{((50 \cos(0.8\pi)) + j(40 + j30) \sin(0.8\pi))} \right]$$

$$50 \times \left[\frac{((40 + j30)(-0.8)) + ((j50)(0.59))}{((50)(-0.8)) + ((30 + j40)(0.59))} \right]$$

$$50 \times \left[\frac{((50 \angle 36.87) \angle 180) + ((50 \angle -90) \angle 0)}{((50 \angle 0) \angle 180) + ((30 \angle 126) \angle 0)} \right]$$

$$50 \times \left[\frac{(40 \angle 216.87) + (29.5 \angle -90)}{(40 \angle 180) + (29.5 \angle 126)} \right]$$

$$50 \times \left[\frac{(-31.9 - j24) + (-17.3 + j23.8)}{(-40 + j0) + (0 - j29.5)} \right]$$

$$50 \times \left[\frac{-49.2 - j0.14}{-40 - j29.5} \right]$$

$$50 \times \left[\frac{49.2 \angle 180.16^\circ}{49.7 \angle 216.41^\circ} \right]$$

$$(50 \angle 0) (0.98 \angle -36.25^\circ)$$

$$Z_{in} = 49 \angle -36.25 \quad \text{or} \quad 39.51 - j28.97$$