

10.1.1.

$$1. \tilde{\rho}_1(0) = \frac{Z_0/2 - 1}{Z_0/2 + 1} = \frac{Z_0/3 \cdot \frac{2}{Z_0} - 1}{Z_0/3 \cdot \frac{2}{Z_0} + 1} = \frac{\frac{2}{3} - 1}{\frac{2}{3} + 1} = -\frac{1}{5}$$

$$2. \tilde{\rho}_1(-\lambda_1/4) = | -1/5 | e^{j(\pi/4)(-\lambda_1/4)} = | -1/5 | e^{-j\pi/4} = -1/5$$

$$Z_1(-\lambda_1/4) = Z_1 \left(\frac{1 - \tilde{\rho}_1(-\lambda_1/4)}{1 + \tilde{\rho}_1(-\lambda_1/4)} \right) = \frac{Z_0}{2} \left(\frac{1 - (-1/5)}{1 + (-1/5)} \right) = \frac{3Z_0}{4}$$

10.1.2.

$$1. \frac{Z_2(0)}{Z_1} = \frac{Z_0}{3} \cdot \frac{2}{Z_0} = 2/3 \rightarrow r = 2/3, x=0$$

$$2. \tilde{\rho}_1(0) \approx 0.2 = 1/5 \neq 180^\circ \text{ (point a)}$$

$$3. \tilde{\rho}_1(-\lambda_1/4) \approx 1.5 = -1/5 \neq 180^\circ \text{ (point b)}$$

$$4. r = 1.5, x = 0$$

$$5. \frac{Z_1(-\lambda_1/4)}{Z_0/2} = 1.5 \rightarrow Z_1(-\lambda_1/4) = \frac{3}{4} Z_0$$

The Complete Smith Chart

Black Magic Design

