

10.2.1.

$$1. \tilde{\rho}_0(0) = \frac{Z_1/Z_0 - 1}{Z_1/Z_0 + 1} = \frac{Z_0/2 \cdot 1/Z_0 - 1}{Z_0/2 \cdot 1/Z_0 + 1} = -\frac{1}{3}$$

$$2. \tilde{\rho}_1(-\lambda_1/4) = 1 - \frac{1}{3} e^{j(\lambda_1/4)} = 1 - \frac{1}{3} e^{-j\pi/2} = -\frac{1}{3}$$

$$Z_0(-\lambda_1/4) = Z_0 \left( \frac{1 - \tilde{\rho}_0(-\lambda_1/4)}{1 + \tilde{\rho}_0(-\lambda_1/4)} \right) = Z_0 \left( \frac{1 - (-\frac{1}{3})}{1 + (-\frac{1}{3})} \right) = 2Z_0$$

10.2.2.

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

$$2. \tilde{\rho}_0(0) \approx 0.333 = \frac{1}{3} \neq 180^\circ \text{ (point c)}$$

$$3. \tilde{\rho}_0(-\lambda_1/4) \approx 2 = -\frac{1}{3} \neq 180^\circ \text{ (point d)}$$

$$4. r = 2, x = 0$$

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

## The Complete Smith Chart

Black Magic Design

