$Z_L = 50 + j25\ \Omega$

$Z_0 = 50$

~~$Z_{LN} = 1 + j0{,}5$~~

$Z_{LN} = 1 + j0{,}5$

$d = 40\text{ cm} = 0{,}4\text{ m}$

$V_s = 60\text{ V}$

$f = 150\text{ MHz} = 1{,}5 \times 10^8$

$R_s = 50\ \Omega$

$\varepsilon_r = 1$

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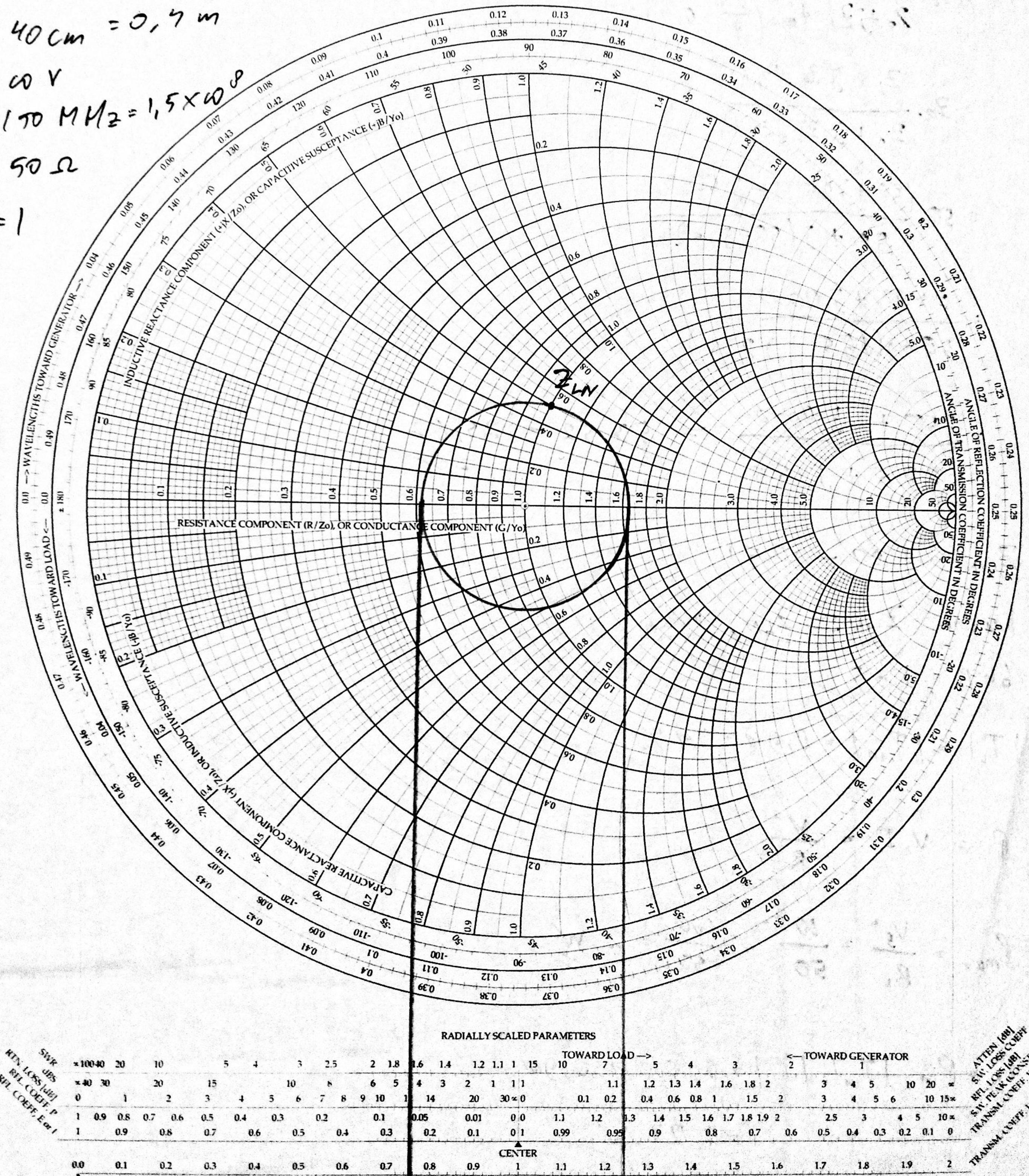
The Complete Smith Chart

Black Magic Design



a. SWR = 1,65

b. $|\Gamma| = 0{,}94 = 94\%$

c. $Z_{in} = Z_o \cdot \frac{Z_L + jZ_o \tan(\beta d)}{Z_o + jZ_L \tan(\beta d)}$ $\beta = \frac{2\pi}{\lambda}$; $\lambda = \frac{c}{f\sqrt{\varepsilon_r}} \cdot \frac{3\times10^8}{1,5\times10^8} = 2$

$= Z_o \cdot \frac{Z_L + jZ_o \tan\left(\frac{2\pi}{2}\cdot 0,4\right)}{Z_o + jZ_L \tan\left(\frac{2\pi}{2}\cdot 0,4\right)}$

$= Z_o \cdot \frac{Z_L + jZ_o \cdot 3,1}{Z_o + jZ_L \cdot 3,1}$

$= 50 \cdot \frac{(50+j25) + j50 \cdot 3,1}{50 + j(50+j25) \cdot 3,1}$

$= \frac{2500 + j9000}{50 + j(\cancel{1}55 + j77,5)}$

$= \frac{2500 + j9000}{-27,5 + j155} = 53,52 - j25,62$

d. $Z_{inN} = 1,07 - j0,51$

Karena $Z_{inN} \simeq Z_{LN}$, maka

SWR = 1,65

e. $|T_L| = |T_{in}| = 0,94 = 94\%$

f. $P = V.I = \frac{V^2}{R}$

$P_{max} = \frac{V_s^2}{R_s} = \frac{10^2}{50} = \frac{100}{50} = 2$ W

g. $P_L = P_{in} \cdot |T_{in}| \cdot |T_L| = 2 \cdot 0,94 \cdot 0,94$

$= 1,77$ W