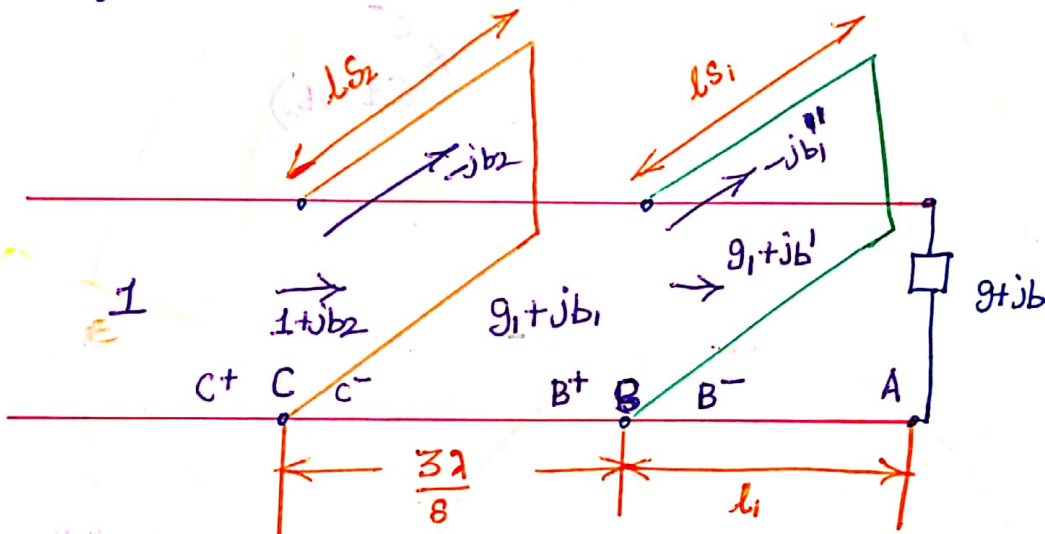


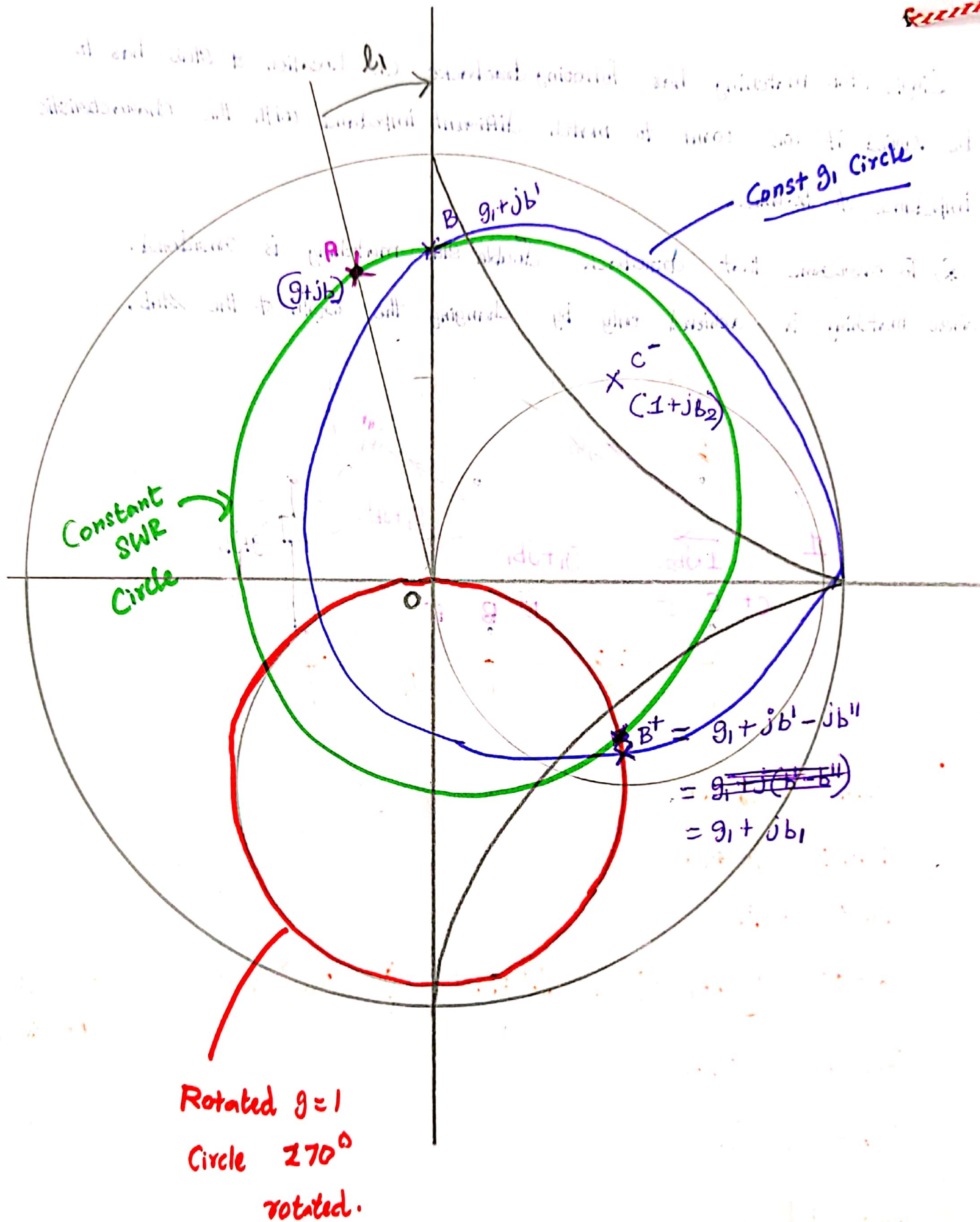
DOUBLE STUB MATCHING

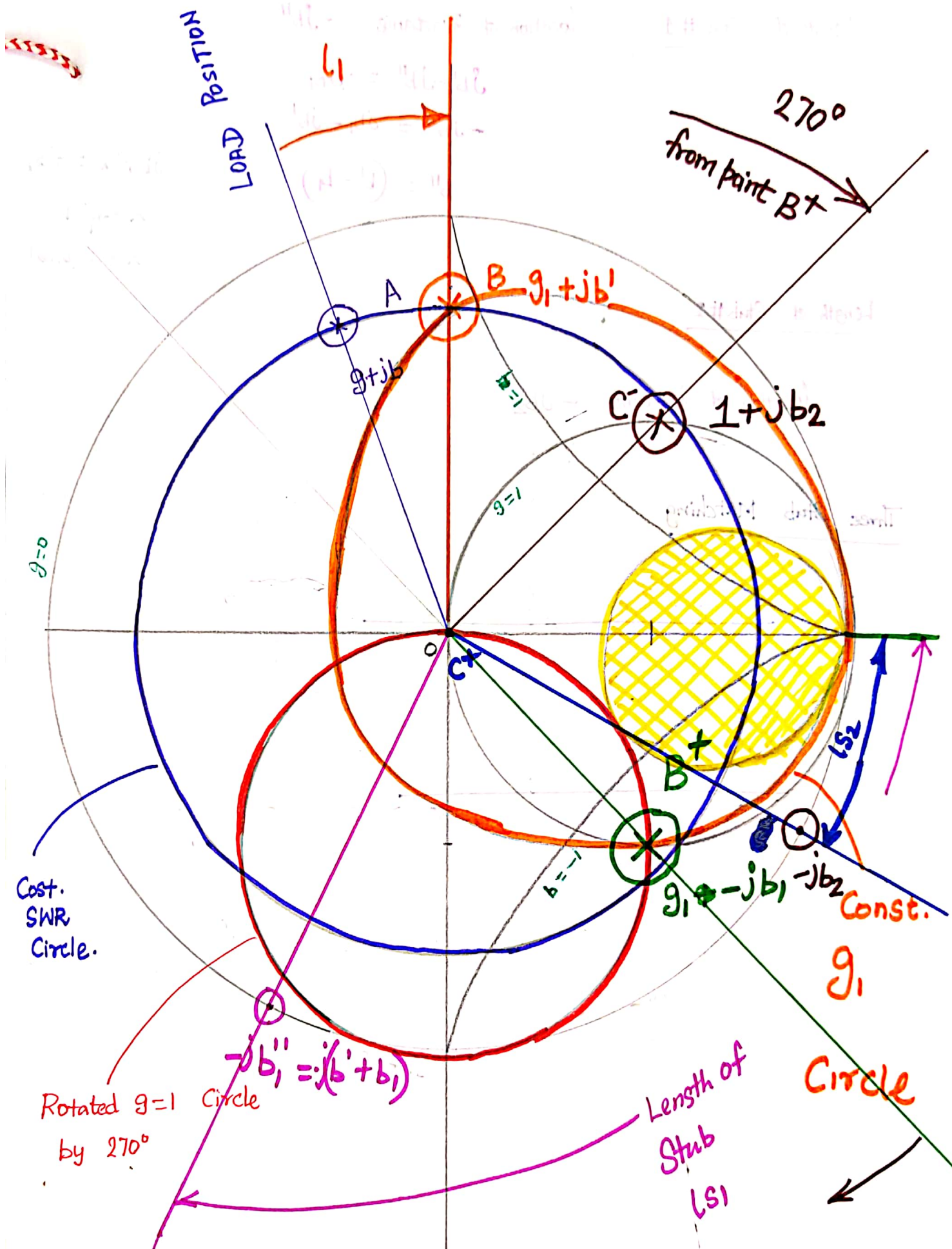
Single Stub matching has following drawbacks (i) Location of stub has to be varied if we want to match different impedance with the characteristic impedance of tx. line.

(*) To overcome that drawback double stub matching is considered. Where matching is achieved only by changing the length of the stub.



Point A	$g + jb$
Point B	$g_1 + jb_1$
Stub 1	$-jb_1''$
Point B ⁺	$g_1 + jb_1 \Rightarrow g_1 + jb_1' + jb_1'' \Rightarrow 270^\circ$ Out of phase with the point C Admittance
Point C	$1 + jb_2$
Stub 2	$-jb_2$
Point C ⁺	1





Length of Stub #1

location of reactance $-jb''$

length
Location of Stub #1

$$jb' - jb'' = jb_1$$

$$-jb'' = jb_1 - jb'$$

$$b'' = (b' - b_1)$$

$$\underline{b'' = (b' - b_1)}$$

$$jb + jx = -jb_1$$

$$x = -b_1 - b$$

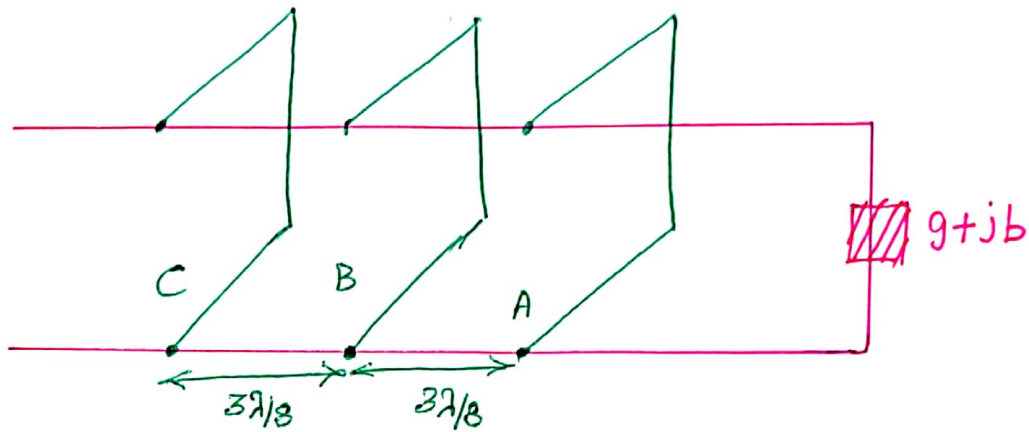
$$x = -(b_1 + b)$$

Length of Stub #2

location of reactance $-jb_2$

Three Stub Matching

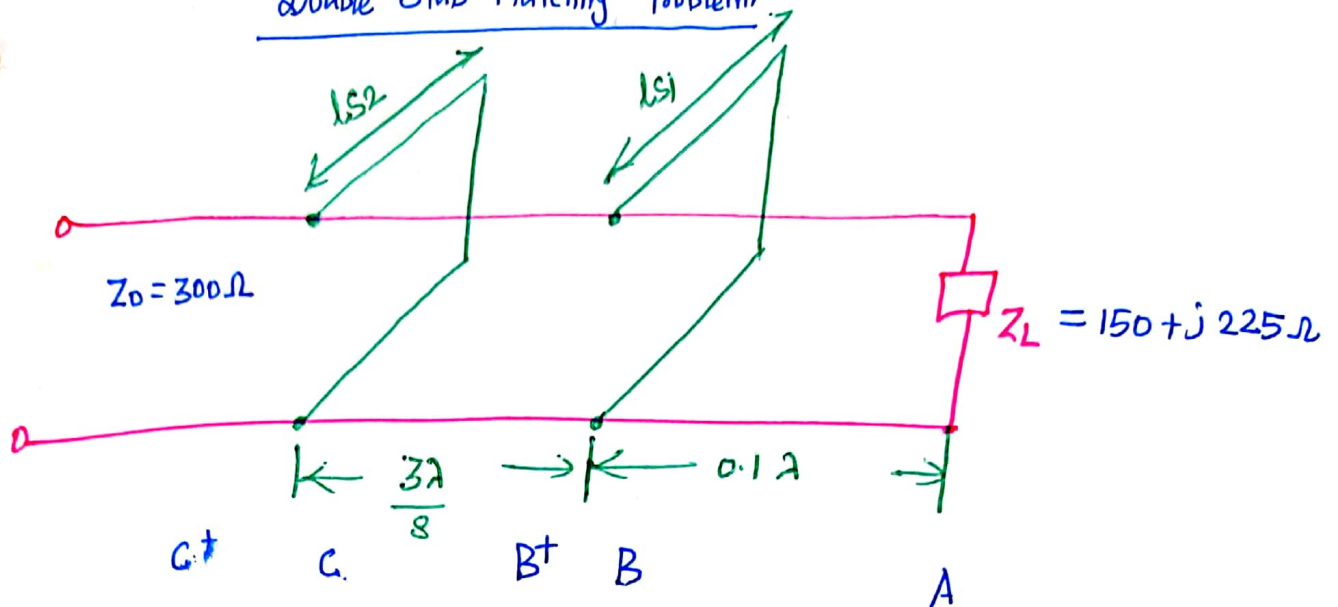
THREE STUB MATCHING



→ If we are able to achieve with stub A & B then we can keep stub C as open circuit.

→ If not we can make use of stub B & C for impedance matching

Double Stub Matching Problem.



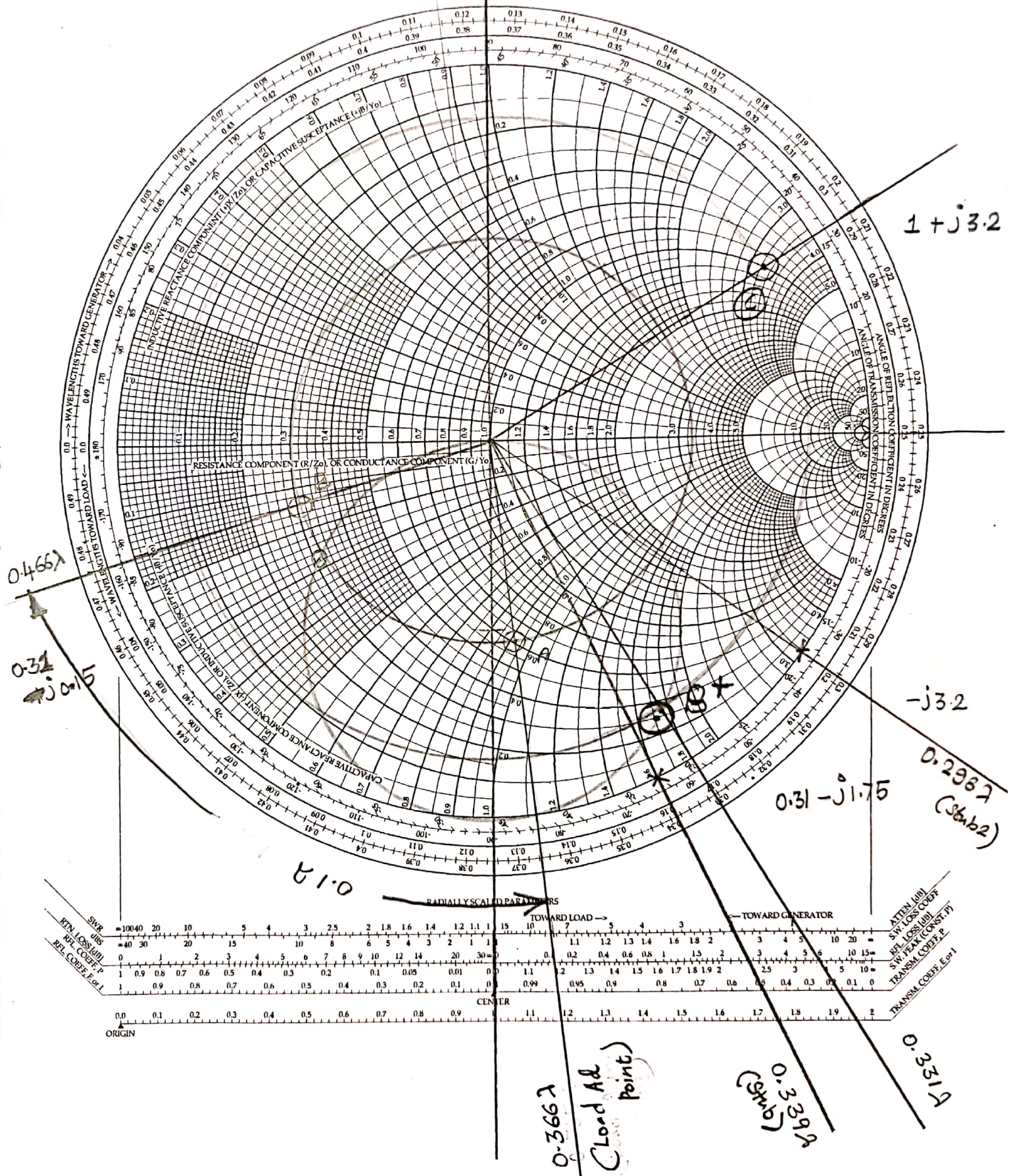
$$\bar{Y}_L = 0.615 - j0.9230$$

$$l_{S1} = 0.089\lambda$$

$$l_{S2} = 0.048\lambda$$

The Complete Smith Chart

Black Magic Design



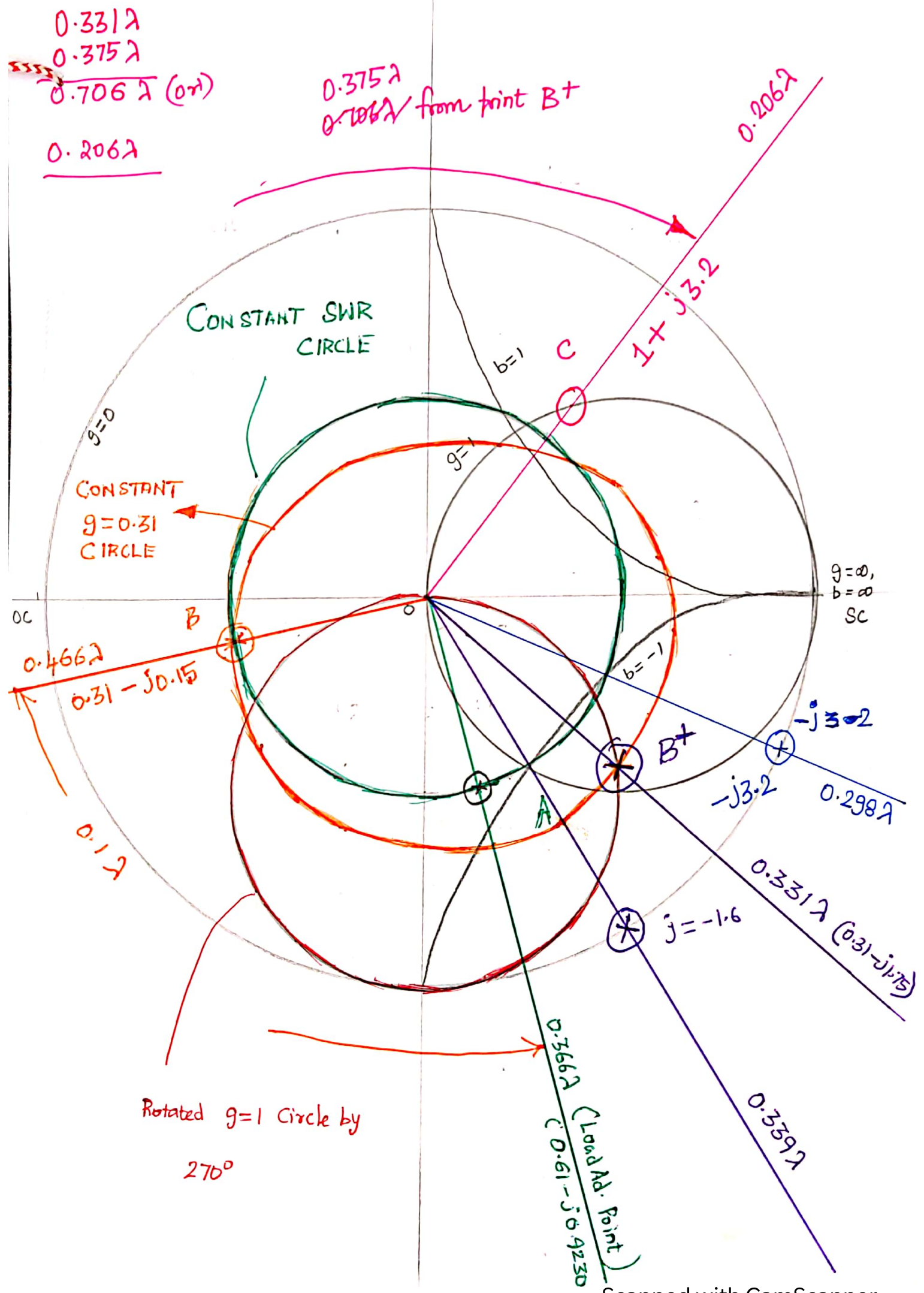
$$B = 0.31 - j0.15$$

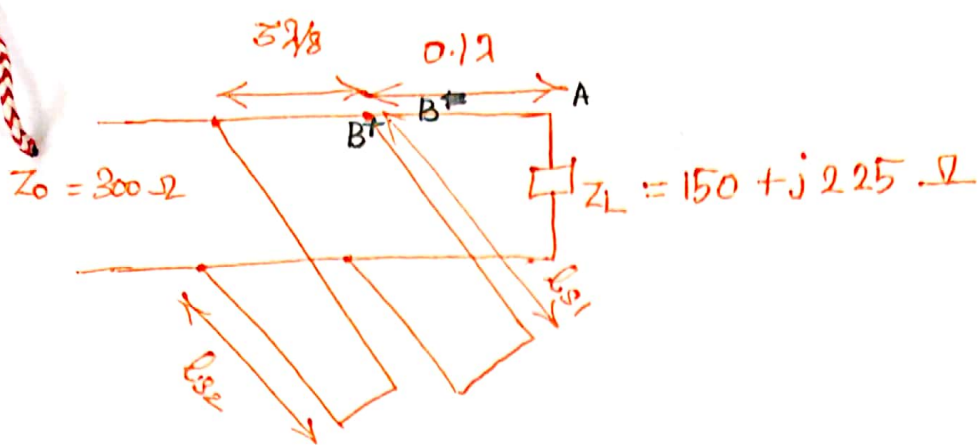
$$B + jx = B^*$$

$$0.31 - j0.15 + jx = 0.31 - j1.75$$

$$jx = -j(1.75) + j0.15 = -j[1.75 - 0.15] = \underline{-j1.60}$$

$$\underline{x = -1.60}$$





$$\bar{Z}_L = \frac{Z_L}{Z_0} = \frac{150 + j225}{300} = 0.5 + j0.75$$

$$\bar{Y}_L = 0.615 - j0.9230$$

$$\begin{array}{r} 1 \\ 0.3312 \\ 0.375 \\ \hline 0.706 \\ 0.5 \\ \hline 0.206 \end{array}$$

0.12 x

$$\text{Point B} = 0.31 - j0.15 \quad (0.466\lambda)$$

$$B^+ = 0.31 - j0.75 \quad (0.3312)$$

$$\text{Stub 1 length} = (0.339\lambda - 0.25\lambda) =$$

$$\text{Stub 1} \quad B + jx = B^+$$

$$0.31 - j0.15 + jx = 0.31 - j0.75$$

$$x = -j0.75 + j0.15 = -j0.60$$

$$\text{Point C} = 0.3312 + 0.375 = 0.7062$$

$$\Rightarrow 1 + j3.2$$

$$\begin{array}{r} 0.339 \\ 0.250 \\ \hline 0.089 \end{array}$$

$$\begin{array}{r} 0.298 \\ 0.25 \\ \hline 0.048 \end{array}$$

Stub 2 $-j3.2$

$$\text{length of Stub \#2} = (0.298 - 0.25)\lambda$$

$$B + jX = B^+$$

$$0.31 - j0.15 + jX = 0.31 - j1.75$$

$$X = -j1.75 + j0.15$$

$$X = -j1.60$$

$$\text{Length of Stub \#1} = 0.339\lambda - 0.25\lambda = 0.089\lambda$$

$$\text{Length of Stub \#2} = 0.298\lambda - 0.25\lambda = 0.048\lambda$$