

Guia resuelta de medios de enlace

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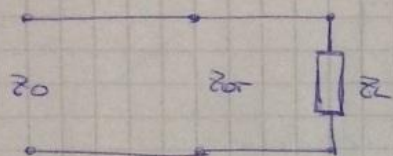
Guia #5 – Lineas de transmisión – Parte C

Nota: Las guias pueden contener errores, las realice en conjunto con compañeros de estudio mientras preparaba los parciales. No debe ser tomado como libro de consulta, mas bien como una ayuda para resolver los ejercicios propuestos. En caso de tener dudas consultar al profesor y/o libros como el Cheng.

Medios de enlace Guía 3 Líneas de transmisión 'c'

34)

$$Z_L = 100 \Omega \quad Z_0 = 50 \Omega \quad \text{con } \frac{\lambda}{4} \text{ trazo.}$$



$$Z_{in} = \sqrt{Z_0 Z_L} = \sqrt{100 \cdot 50} = 70.71 \Omega$$

35)

$$Z_L = (55 + j60) \quad Z_0 = 50 \Omega \quad \text{Diagrama Ej 35}$$

$$Z_{in} = \sqrt{Z_0^2 \cdot R_{OE}} = 86.6 \Omega$$

$$\gamma l = \frac{Z_L}{Z_0} = 1.6279 e^{j47.49} = 1.1 + j1.2$$

$$R_{OE} = 3$$

$$l = 0.077 \lambda$$

36) Coaxial $Z_0 = 50 \Omega$ $\epsilon_r = 1$ $r_{ext} = 10 \text{ mm}$ $Z_L = 75 \Omega$

$f = 1 \text{ GHz}$ $\frac{\lambda}{4}$ con coaxial del mismo radio ext.

a) $Z_0 = \frac{60}{\epsilon_r} \ln \left(\frac{r_{ext}}{r_{int}} \right) \Rightarrow r_{int} = 4.346 \text{ mm}$

b) $\gamma l = \frac{Z_L}{Z_0} = 1.5 \Rightarrow$ como no tiene parte reactiva $\Rightarrow R_{OE} = 1.5$

$$Z_{in} = \sqrt{R_{OE} \cdot Z_0^2} = 61.237 \Omega$$

$$\frac{\lambda}{4} = \frac{c}{f \cdot 4} = 0.075 \text{ m} = 75 \text{ mm}$$

$$Z_{in} = \frac{60}{\epsilon_r} \ln \left(\frac{r_{ext}}{r_{int}} \right) \Rightarrow r_{int} = 3.6 \text{ mm}$$

Diagrama Ej 36

$$37) Z_L = (200 + j100) \quad Z_0 = 50 \Omega \quad f = 600 \text{ MHz}$$

$$Z_L = \frac{(200 + j100)}{50} = 4 + j2 \quad \text{Diagram Fig. 37}$$

$$R_{OE} \approx 5$$

$$Z_{or} = \sqrt{R_{OE} \cdot Z_0^2} = 111,8 \Omega$$

$$\frac{\lambda}{4} = \frac{c}{f \cdot 4} = 0,125 \text{ m} = 12,5 \text{ cm} = 125 \text{ mm}$$

$$L = 0,016 \lambda = 8 \cdot 10^{-3} \text{ m}$$

$$38) \text{ Diagram Fig. 38}$$

$$Z_L = \frac{Z_L}{Z_0} = 0,5 + j0,5$$

$$Z_L = (25 + j25) \Omega \quad Z_0 = 50 \Omega$$

$$R_{OE} \approx 2,65 \Rightarrow Z_{or} = \sqrt{R_{OE} \cdot Z_0^2} = 81,4 \Omega$$

$$39) \text{ Diagram Fig. 39}$$

$$b) Z = (100 - j90) \Omega \quad Z_0 = 50 \Omega \quad f = 500 \text{ MHz} \quad R_{OE} \approx 3,5$$

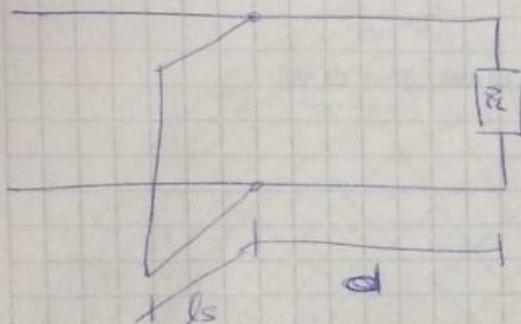
$$Z_L = \frac{Z_L}{Z_0} = 2 - j1,8 \quad Z_{or} = \sqrt{R_{OE} \cdot Z_0^2} \approx 93,54 \Omega$$

$$\frac{\lambda}{4} = \frac{c}{f \cdot 4} = 0,15 \text{ m} \Rightarrow \lambda = 0,6 \text{ m}$$

$$l = 0,042 \lambda = 0,0252 \text{ m} = 2,52 \text{ cm} = 25,2 \text{ mm}$$

$$a) d = 0,128 \lambda \quad l_s = 0,096 \lambda$$

42) $f = 300 \text{ MHz} \Rightarrow \lambda = \frac{c}{f} = 1 \text{ m}$ Adaptar com 1 stub
 $Z_L = (100 - j100) \Omega$ $Z_0 = 50 \Omega$ em certo circuito.



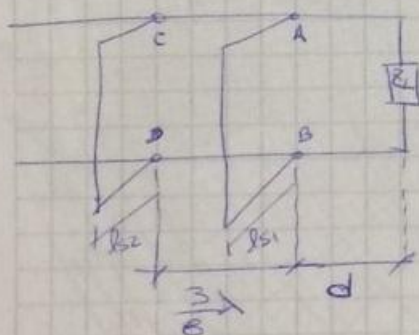
$$Z_L = \frac{Z_L}{Z_0} = 2 - j2 \quad \text{Pos} \approx 4,3$$

Ver diagrama Ej. 42

43) $Z_L = 150 \Omega$ $Z_0 = 50 \Omega$ $d = 0,375 \lambda$ dist. entre stubs $\frac{3\lambda}{8}$

Amplas stubs em certo

$$Z_L = \frac{Z_L}{Z_0} = \frac{150}{50} = 3 = \text{Pos}$$



$$b_{\text{stub}} = b'_{AB} - b_{AB} = -0,08 + 0,08 = 0,12$$

Diagrama Ej. 43

44) 2 stubs em certo circuito separados $\frac{3\lambda}{8}$

$f = 450 \text{ MHz}$ $d = 4,66 \text{ cm}$ $Z_L = (200 + j100) \Omega$ $Z_0 = 50 \Omega$

$\lambda = \frac{c}{f} = 0,6 \text{ m} \Rightarrow d = 0,069 \lambda \approx 0,07 \lambda$

$$Z_L = \frac{Z_L}{Z_0} = \frac{(200 + j100)}{50} = 4 + j2$$

Diagrama Ej. 44

$$b_{\text{stub}} = b'_{AB} - b_{AB} = -0,38 - 0,36 = -0,74$$

45) Diagrama $\equiv j45$

$$d = 0,1\lambda$$

$$f = 300 \text{ MHz}$$

2 stubs en corto circuito

separados $\frac{3}{8}\lambda$

$$Z_L = 500 \Omega$$

$$Z_0 = 100 \Omega \Rightarrow$$

$$\gamma_L = \frac{Z_L}{Z_0} = 5 = \rho_{\text{ref}}$$

$$\lambda = 1 \text{ m}$$

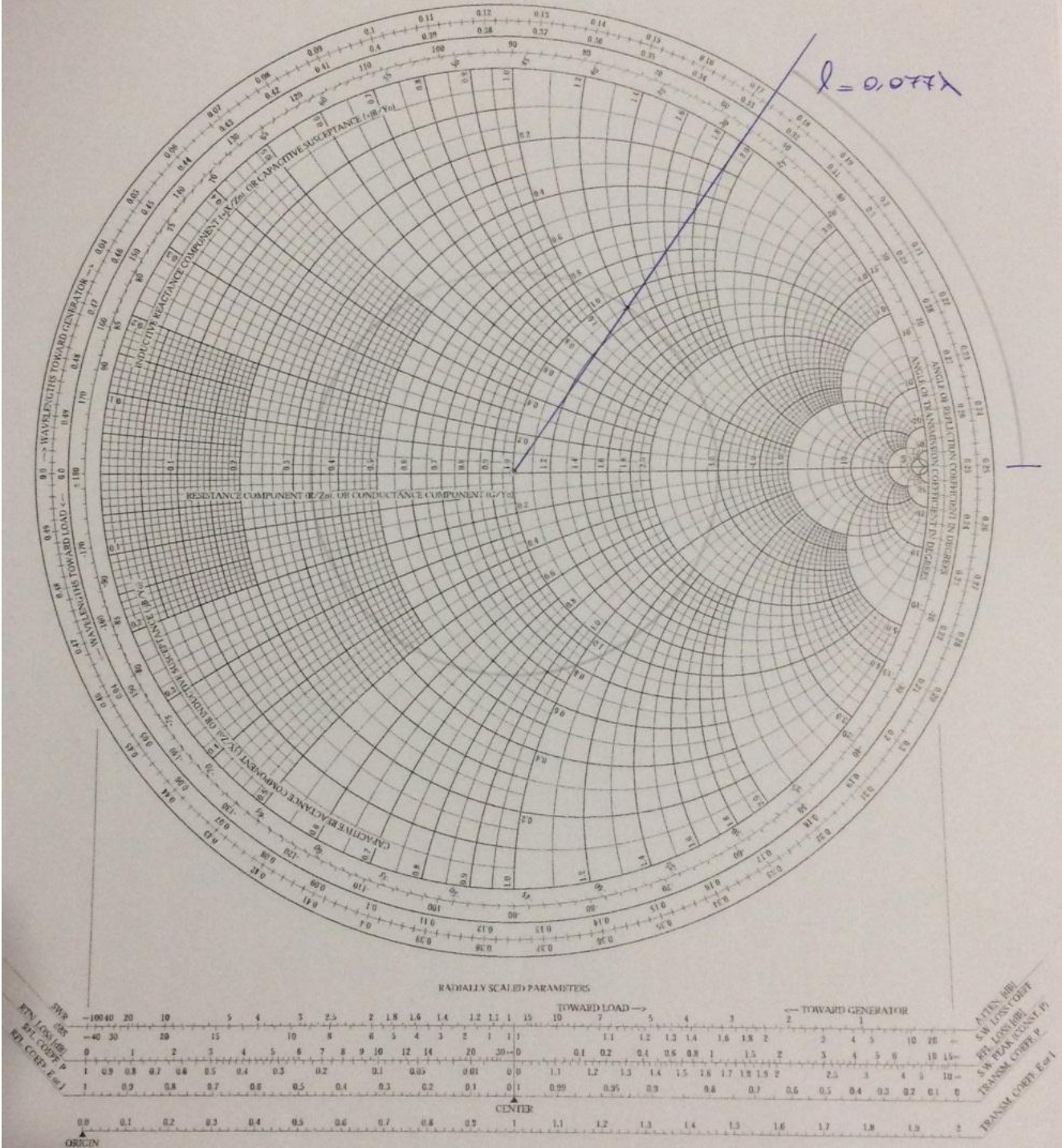
$$b_{\text{stub}} = b'_{\text{AB}} - b_{\text{AB}} = -0,28 - 0,68 \stackrel{+}{=} -0,96$$

Diagram

Ej 38

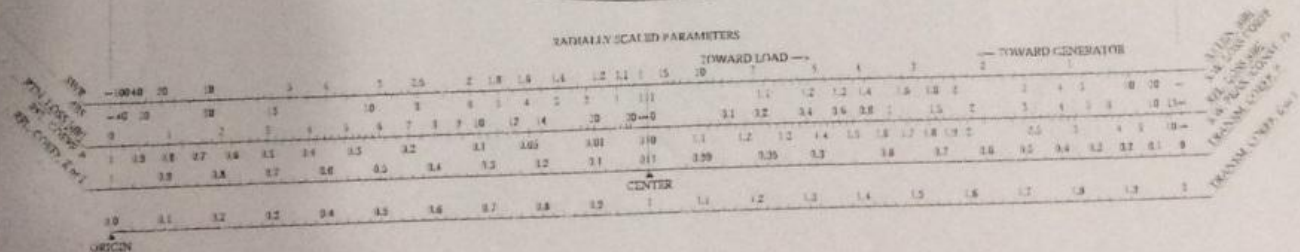
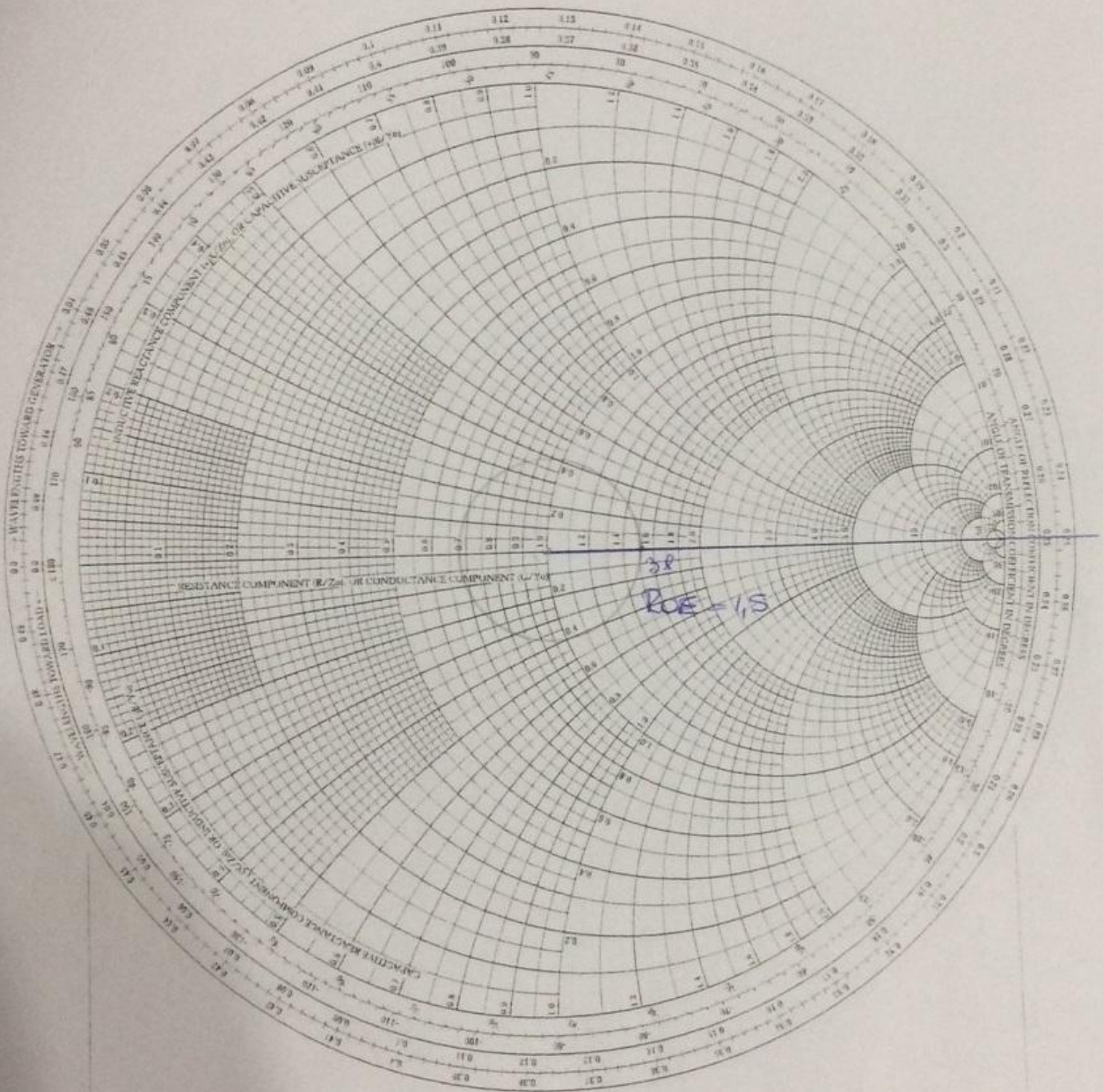
The Complete Smith Chart

Black Magic Design



The Complete Smith Chart

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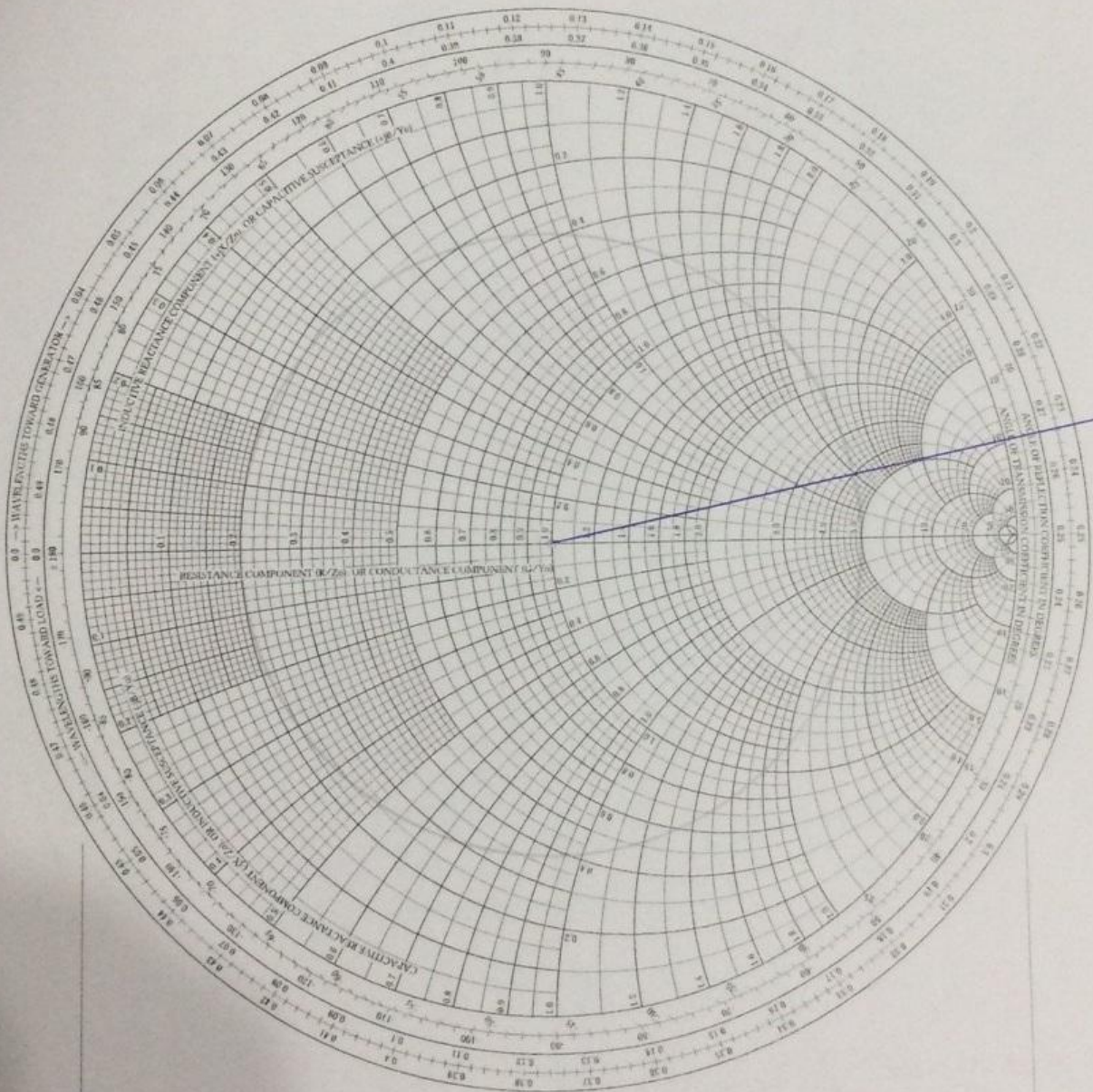


Dogear

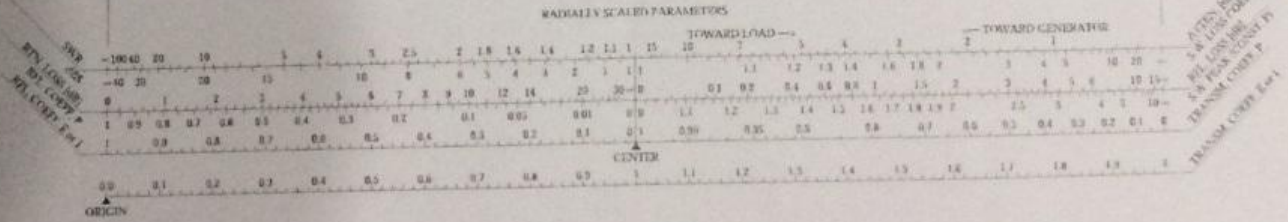
EJ 37

The Complete Smith Chart

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RADIALLY SCALED PARAMETERS

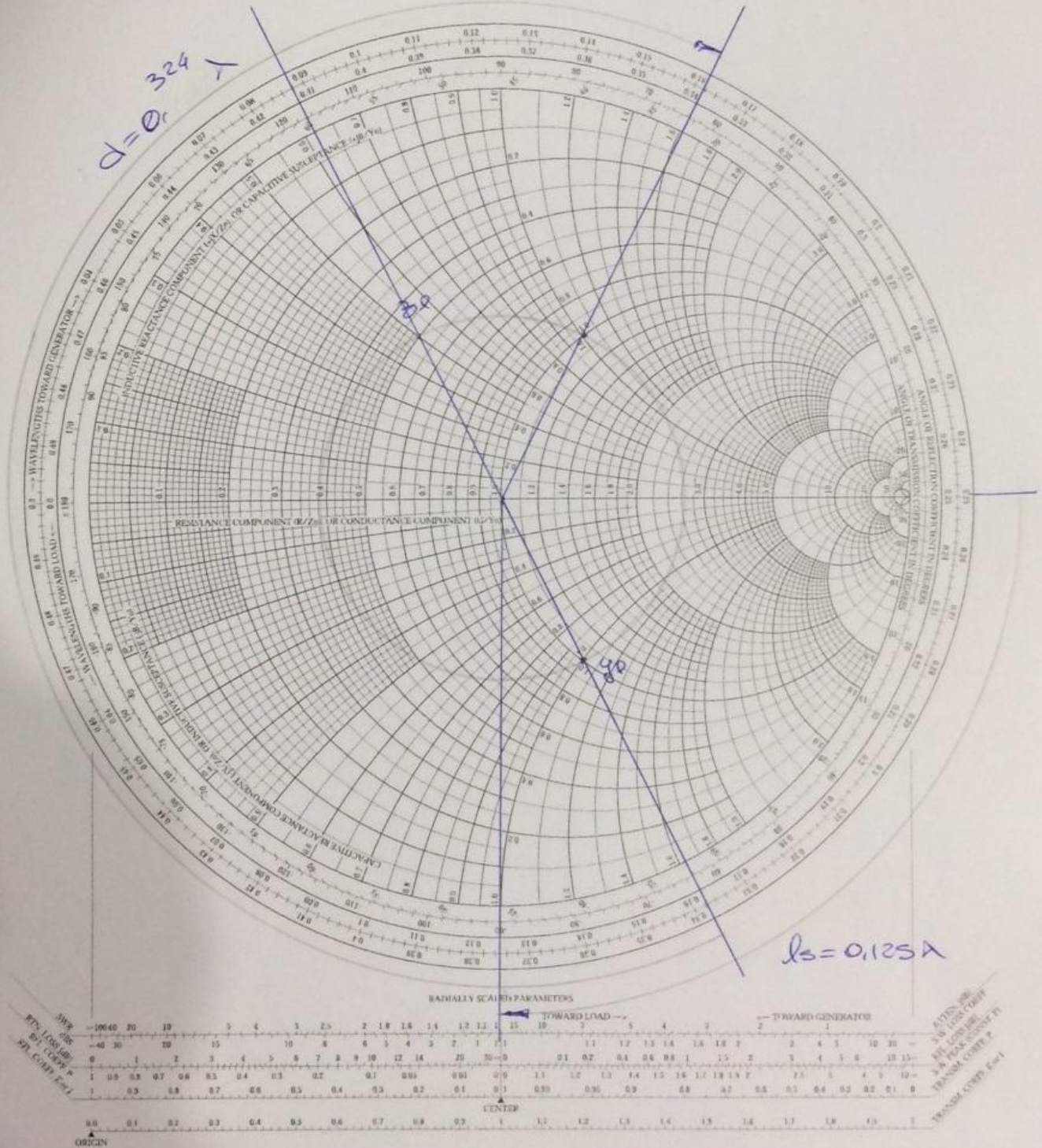


Diagram

Ej. 38

The Complete Smith Chart

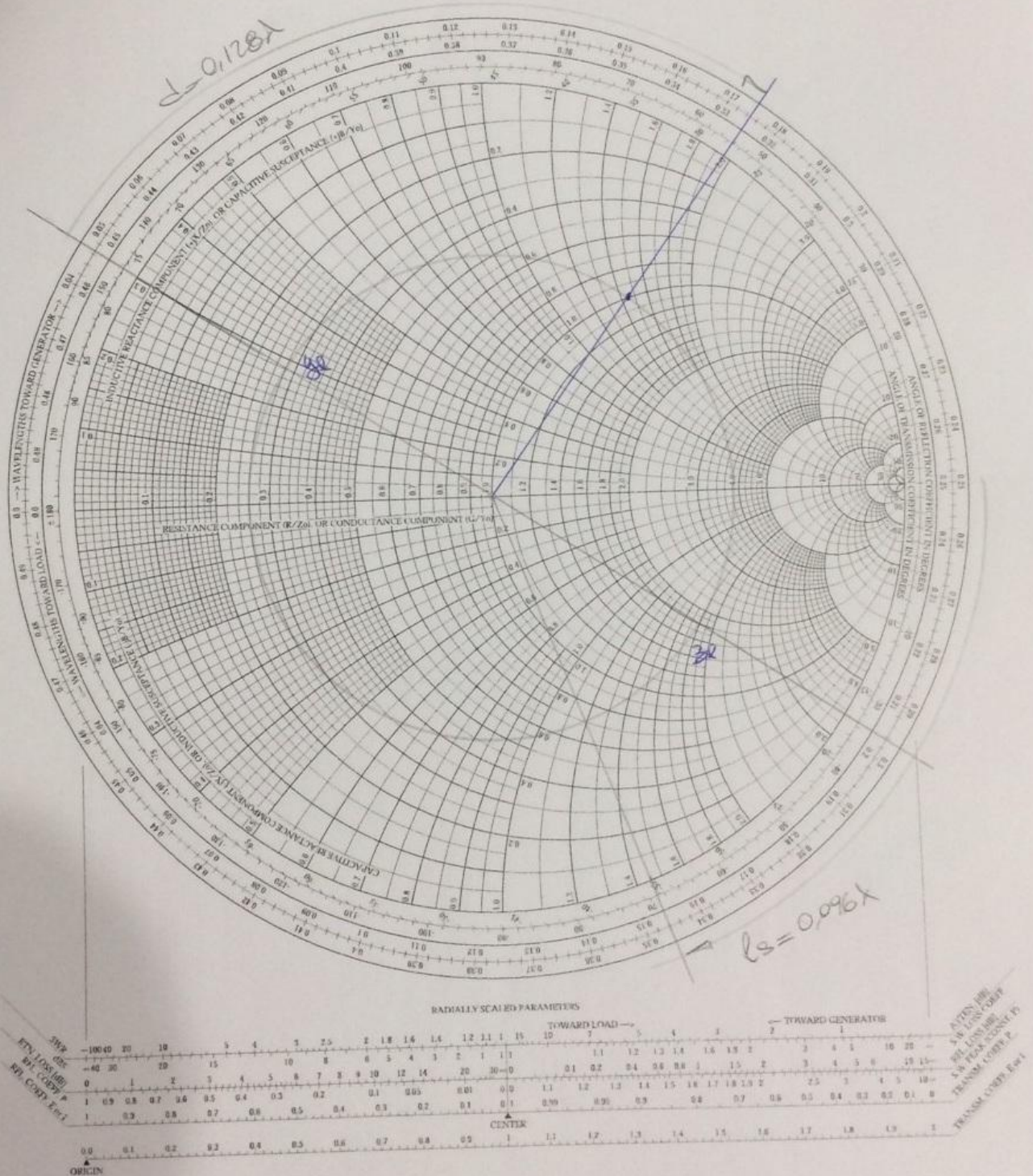
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208 EJ 39

The Complete Smith Chart

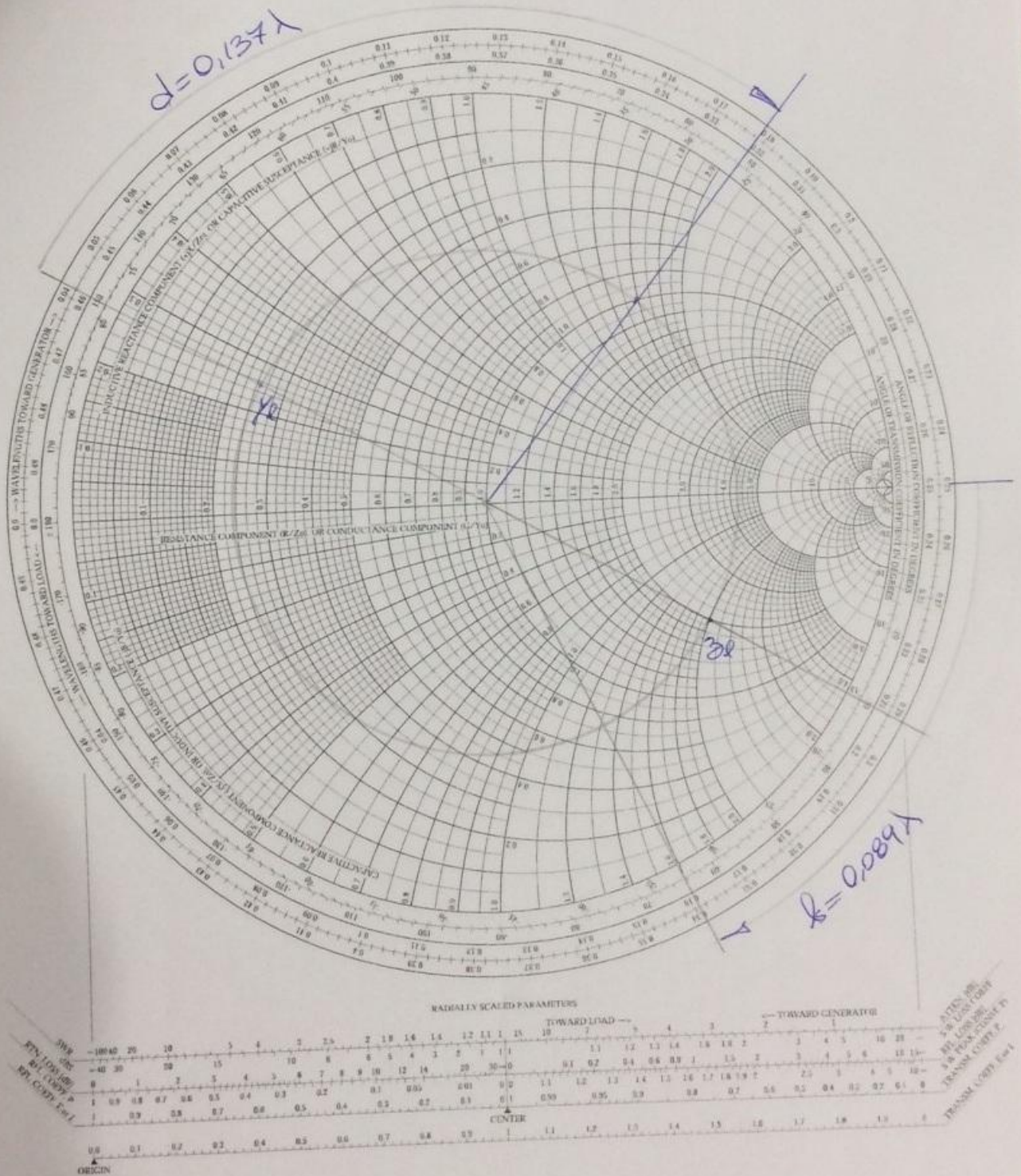
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48 Diagram

The Complete Smith Chart

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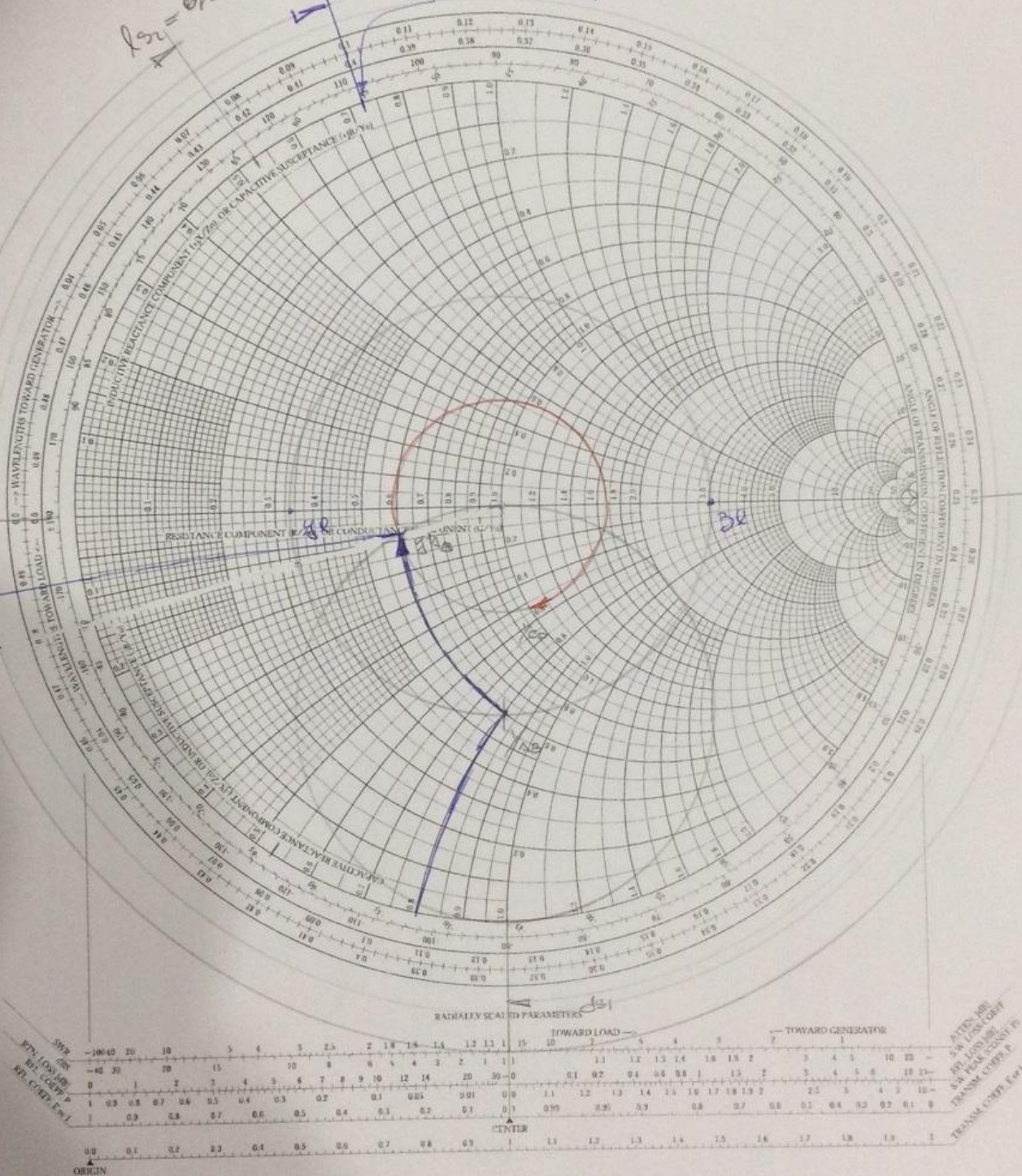


Ej 43

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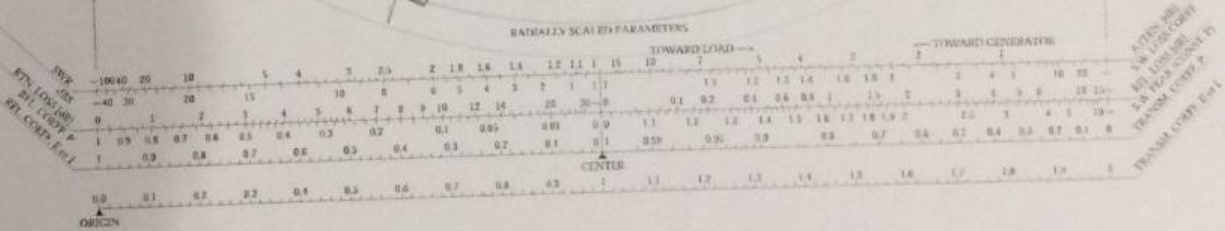
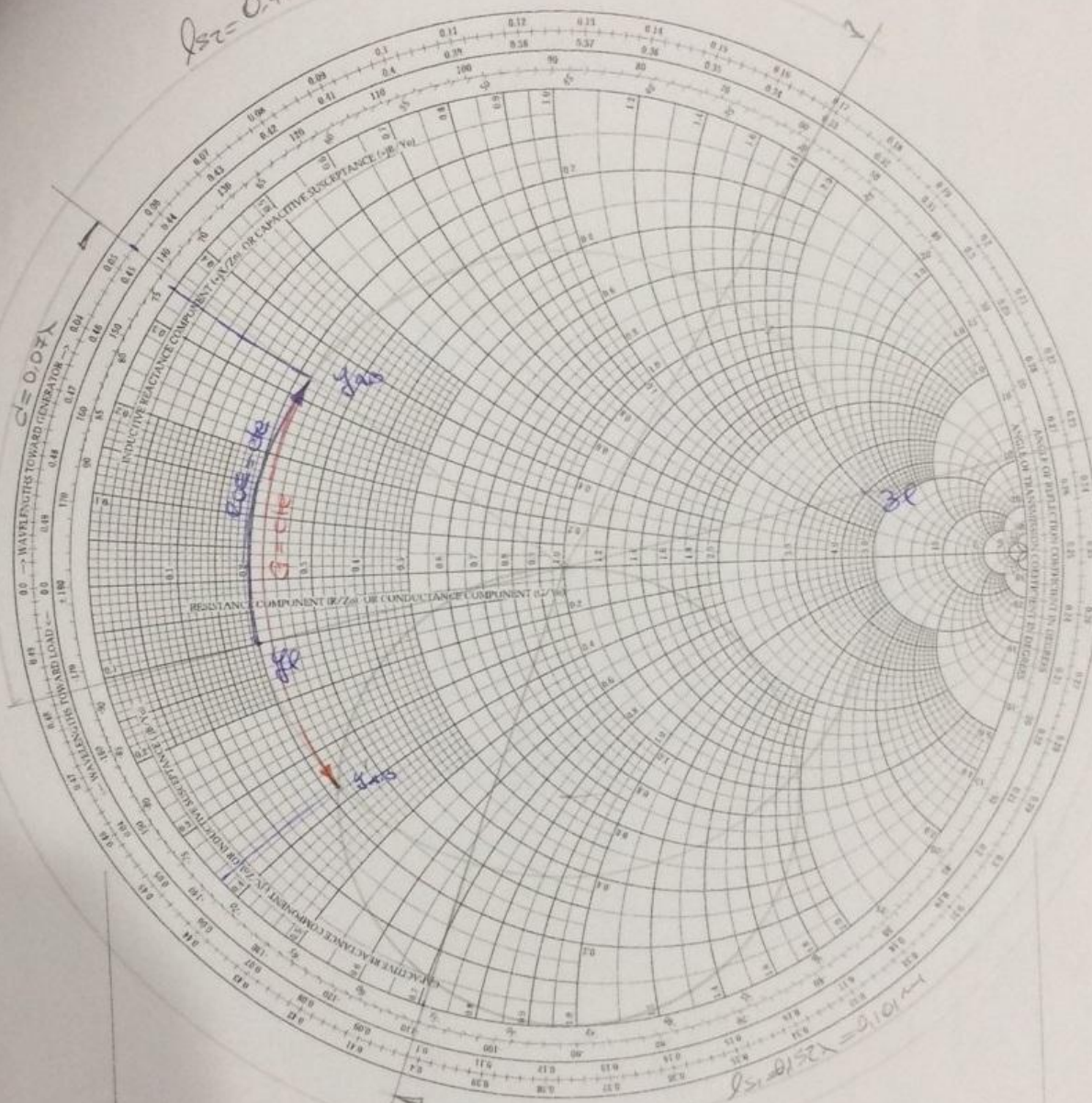
$$\lambda_1 = \frac{b'_{AO} - b_{AO}}{2} = 0,35 \lambda$$



The Complete Smith Chart

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$$\Gamma_{SWR} = 0.419 \lambda = 0.27795 \lambda$$



Ejercicio 45 Diagrama

The Complete Smith Chart

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