

11.59 A 50Ω air-filled slotted line is applied in measuring a load impedance. Adjacent minima are found at 14 cm and 22.5 cm from the load when the unknown load is connected, and $V_{\max} = 0.95 \text{ V}$ and $V_{\min} = 0.45 \text{ V}$. When the load is replaced by a short circuit, the minima are 3.2 cm to the load. Determine s , f , Γ , and Z_L .

$$(11.38) \quad S = \frac{V_{\max}}{V_{\min}} = \frac{0.95 \text{ V}}{0.45 \text{ V}} = \underline{\underline{2.11 = S}}$$

↳ plot on Smith Chart

$$|\Gamma| = \frac{2.11 - 1}{2.11 + 1} = \underline{\underline{0.357}}$$

$$\frac{\lambda}{2} = 22.5 \text{ cm} - 14 \text{ cm} = 8.5 \text{ cm} \quad \lambda = 17 \text{ cm}$$

$$u = f\lambda \rightarrow f = \frac{u}{\lambda} = \frac{2.9979 \times 10^8}{17 \times 10^{-2}}$$

$$\underline{\underline{f = 1.7635 \text{ GHz}}}$$

$$\frac{l}{\lambda} = \frac{3.2 \text{ cm}}{17 \text{ cm}} = 0.1882 \leftarrow \text{move "Toward Load" from } V_{\min}/r_{\min}$$

Read $y_L = 1.4 - j0.8 \text{ } \Omega$

$$\underline{\underline{Z_L = y_L Z_0 = 70 - j40 \text{ } \Omega}}$$

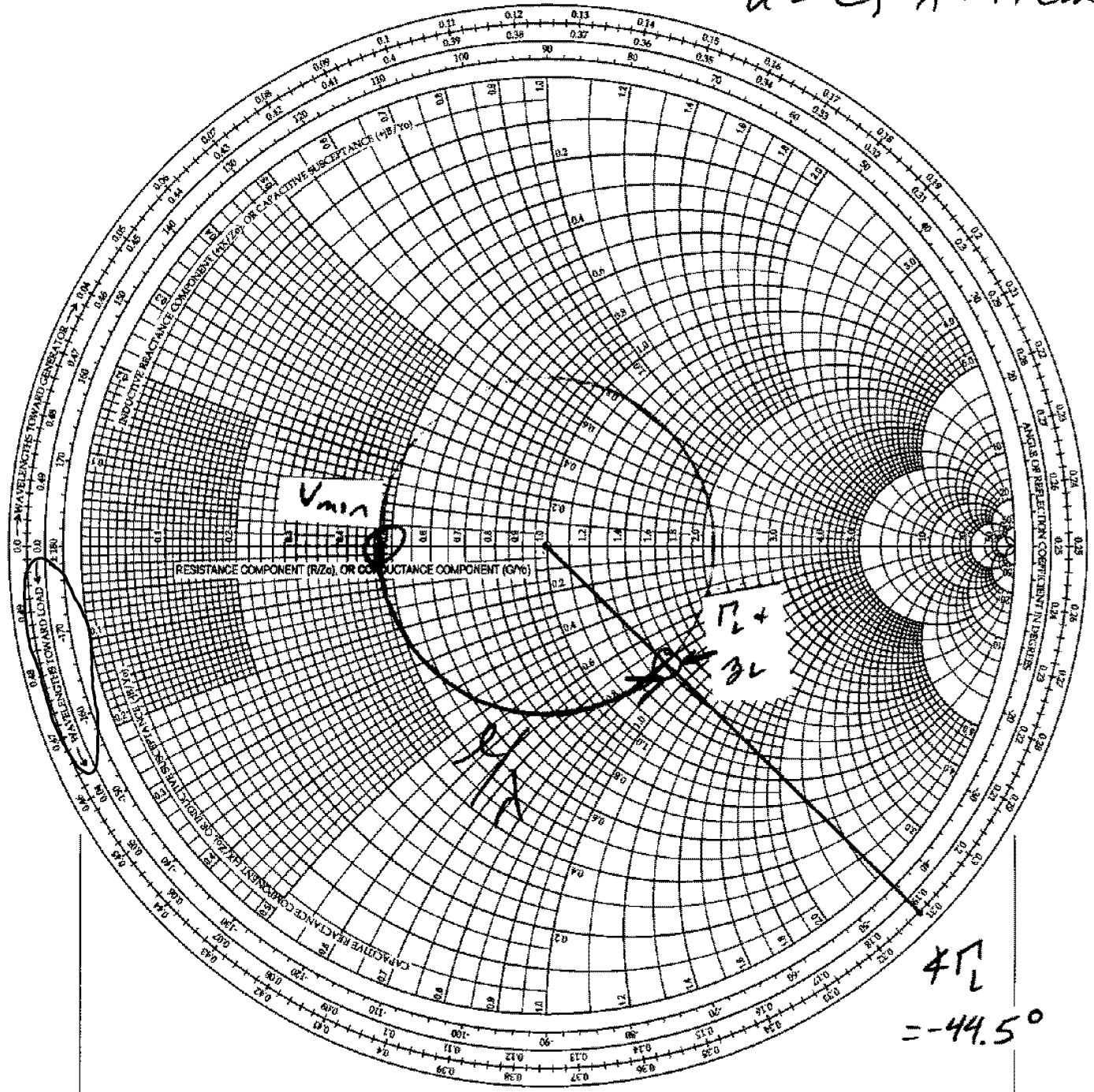
$$\angle \Gamma_L = -44.5^\circ$$

$$\underline{\underline{\Gamma_L = 0.357 \angle -44.5^\circ}}$$

Simple Smith Chart

$Z_0 = 50 \Omega$

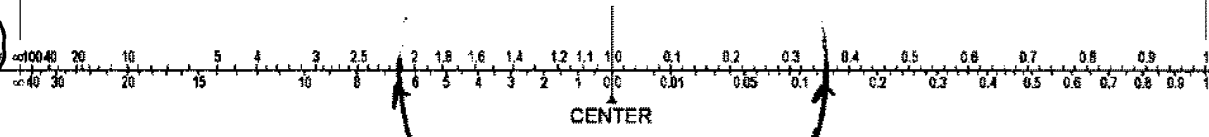
$u = c, \lambda = 17 \text{ cm}$



RADIALLY SCALED PARAMETERS

SWR (NSWR)
SWR (dB)

REFL. COEFF. V (av)
REFL. COEFF. P



$s = 2.1$

$|\Gamma| = 0.36$

4π
 $= -44.5^\circ$