Problem 1:

(a) $|\Gamma| = \frac{a}{a+b} = .247$

Phase of $\Gamma = 76^{\circ}$

(b) $\text{SWR} = \frac{1+|\Gamma|}{1-|\Gamma|} = 1 + \frac{2a}{b} = 1.66$

(c) $\tilde{Z}_{in}(.35\lambda) = .6 - j.025 \rightarrow Z_{in}(.35\lambda) = Z_o\tilde{Z}_{in}(.35\lambda) = 30 - j1.25\,\Omega$

(d) $\tilde{Y}_{in}(.35\lambda) = 1.65 + j.02 \rightarrow Y_{in}(.35\lambda) = Y_o\tilde{Y}_{in}(.35\lambda) = .033 +$

$j.0004\,\Omega^{-1}$

(e) Seen on the Smith Chart for problem 1: the minimal distance = .104λ

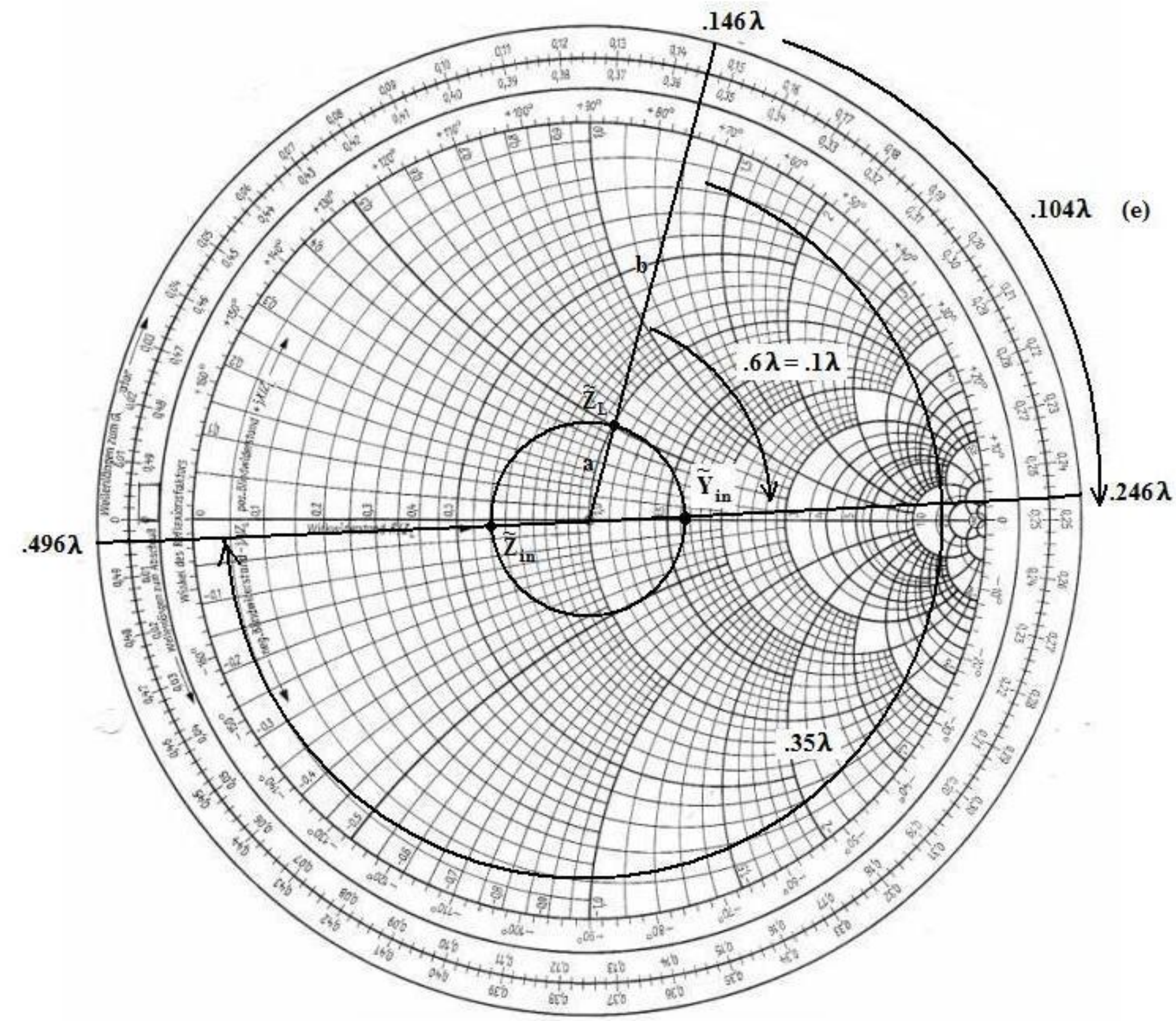
(f) $\Gamma = \frac{Z_L - Z_o}{Z_L + Z_o} = .2425 < 75.96°$

$SWR = \frac{1+|\Gamma|}{1-|\Gamma|} = 1.64$

$$\tilde{Z}_{in}(.35\lambda) = Z_o\left(\frac{Z_L + jZ_o\tan(\beta l)}{Z_L + jZ_o\tan(\beta l)}\right) = 30.5 - j1.09\,\Omega$$

The Smith Chart values are in fairly good agreement with those analytically calculated.

Problem 1 Smith Chart



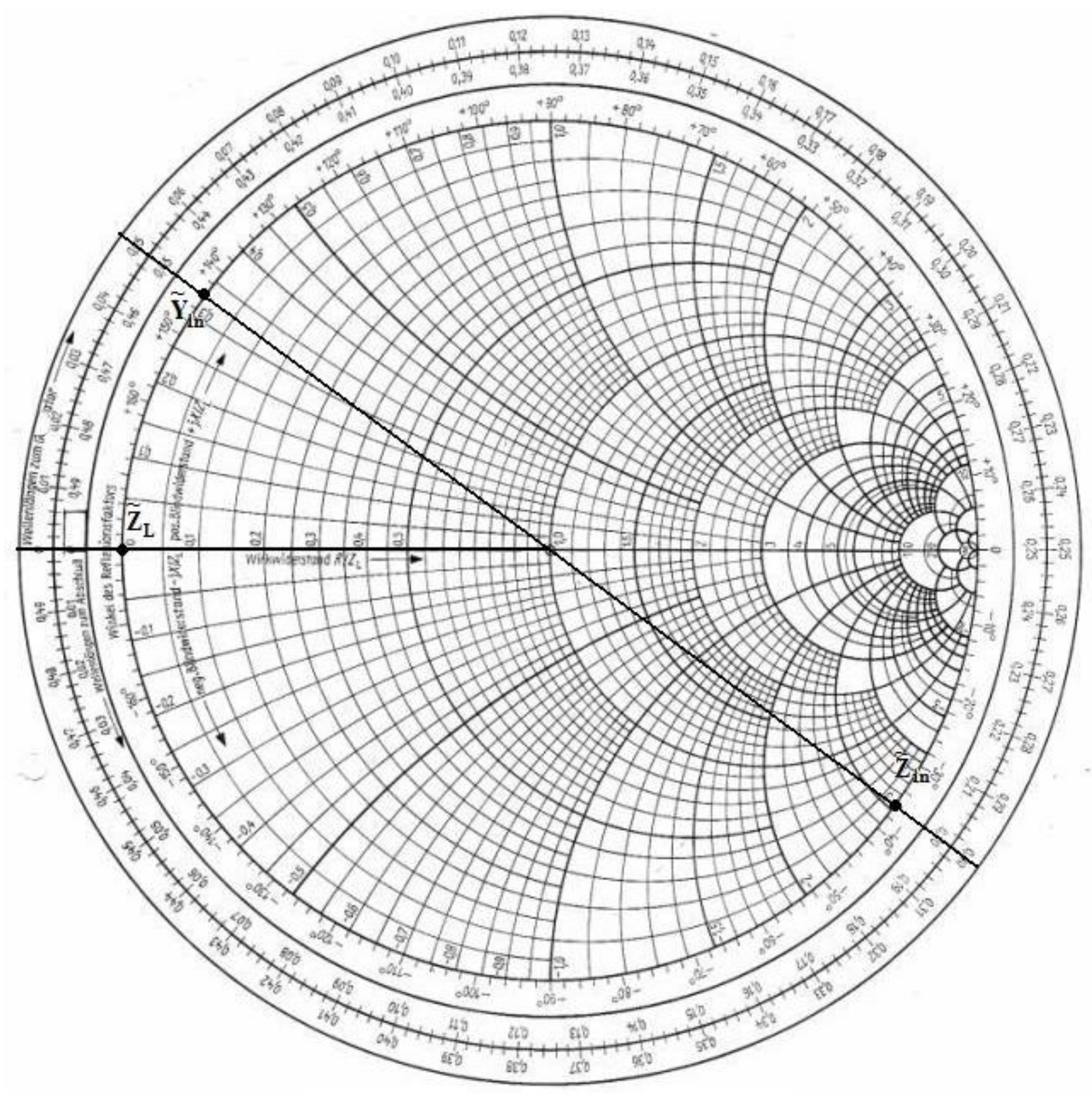
Problem 2:

(a) Γ_L=-1

(b) $\tilde{Z}_{in}(2.3\lambda = .3\lambda) = -j3.08 \rightarrow Z_{in}(2.3\lambda = .3\lambda) = -j154\,\Omega$

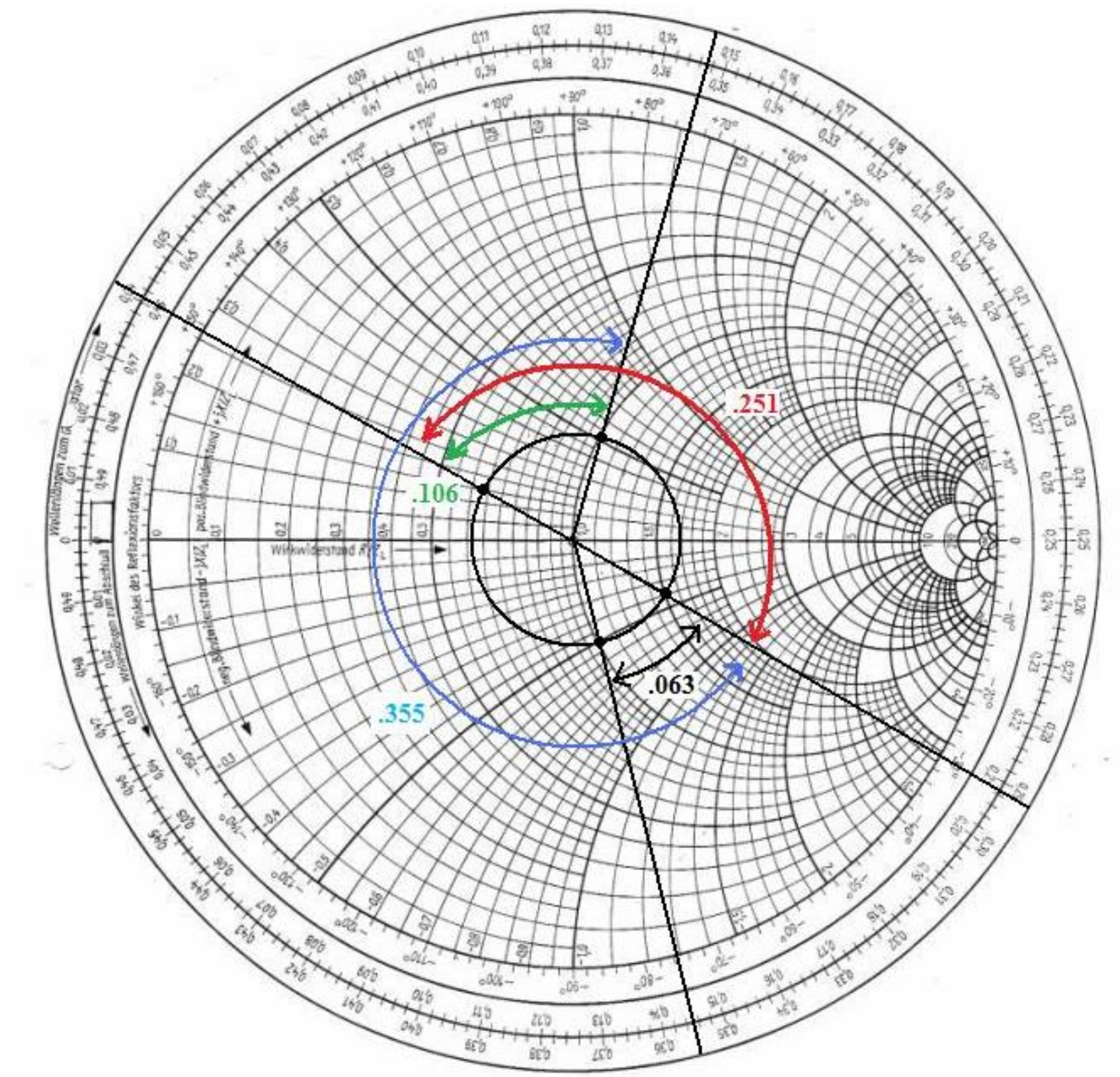
(c) $\tilde{Y}_{in}(2.3\lambda = .3\lambda) = j.325 \rightarrow Y_{in}(2.3\lambda = .3\lambda) = j.0065\,\Omega$

Smith Chart for Problem 2

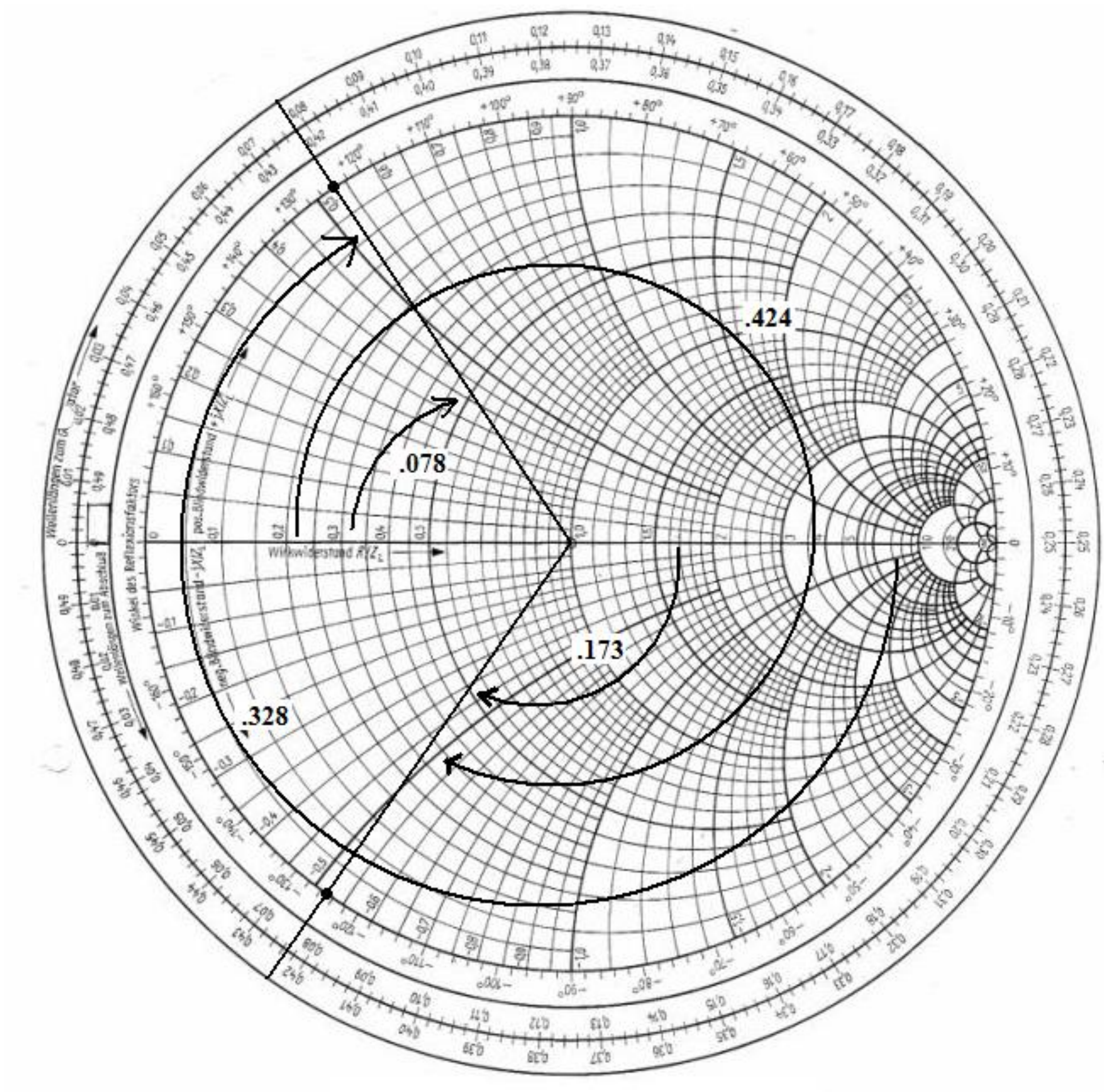


Problem 3,4,5,6:

Smith Chart for Problem 3,4,5,6 Used for Determining Stub Distances



Smith Chart used for Determining Stub Lengths:



Problem 3: Series – Open

Distance 1 = .063λ (Black)

- Length = .328λ

Distance 2 = .355λ (Blue)

- Length = .173λ

Problem 4: Series – Short

Distance 1 = .063λ (Black)

- Length = .078 λ

Distance 2 = .355λ (Blue)

- Length = .424λ

Problem 5: Shunt – Open

Distance 1 = .106 λ (Green)

- Length = .424 λ

Distance 2 = .314 λ (Red+Black)

- Length = .078 λ

Problem 6: Shunt – Short

Distance 1 = .106 λ (Green)

- Length = .173 λ

Distance 2 = .314 λ (Red + Black)

- Length = .328 λ