

11.38 The distance from the load to the first minimum voltage in a 50Ω line is 0.12λ and the standing wave ratio $s = 4$.

- Find the load impedance Z_L .
- Is the load inductive or capacitive?
- How far from the load is the first maximum voltage?

a) + Draw circle of constant $S = 4$ ($|r| = \frac{4-1}{4+1} = 0.6$)
on Smith Chart

* For $r_{\min} = \frac{1}{S} = 0.25 \Omega$, we know V_{\min} location
on this circle

* Go 0.12λ "WAVELENGTHS TOWARD LOAD" from
 $r_{\min} = 0.25 \Omega$ to $z_L = 0.45 - j0.83 \Omega$

$$Z_L = Z_0 z_L = 50(0.45 - j0.83) = \underline{\underline{22.5 - j41.5 \Omega}}$$

b) Since reactive part of Z_L is less than zero
 \Rightarrow capacitive

c) The voltage maxima occurs @ $r_{\max} = 4$
which is 0.25λ from r_{\min} . Going
"WAVELENGTHS TOWARD GENERATOR"
from z_L , it would require a minimum
distance of $0.12\lambda + 0.25\lambda = \underline{\underline{0.37\lambda}}$
to arrive @ r_{\max}

Simple Smith Chart

Problem 11.38
 $Z_0 = 50 \Omega$

