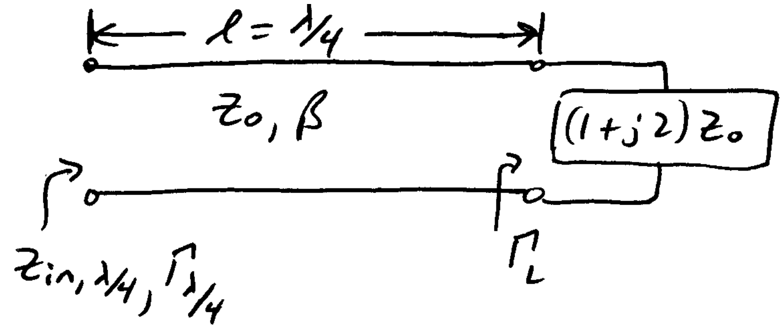
11.37 Determine the impedance at a point $\lambda/4$ distant from a load of impedance $(1 + j2)Z_o$.

- Solve analytically. Also, find the load reflection coefficient Γ_L, reflection coefficient $\Gamma_{\lambda/4}$ a $\lambda/4$ from load, and standing wave ratio.



(11.36) $\Gamma_L = \dfrac{Z_L - Z_o}{Z_L + Z_o} = \dfrac{(1+j2)Z_o - Z_o}{(1+j2)Z_o + Z_o} = \dfrac{1+j2-1}{1+j2+1}$

$\Gamma_L = 0.7071\angle 45^\circ$

Adapt (11.37), $\Gamma_{\lambda/4} = \Gamma_L\, e^{-j2\beta\ell} = (0.7071\angle 45^\circ)\, e^{-j2\frac{2\pi}{\lambda}\lambda/4}$

$\Gamma_{\lambda/4} = 0.7071\angle -135^\circ$

(11.38a) $SWR = S = \dfrac{1+|\Gamma|}{1-|\Gamma|} = \dfrac{1+0.7071}{1-0.7071}$

$S = 5.828$

Notes, $Z_{in,\lambda/4} = Z_o \dfrac{1+\Gamma_{\lambda/4}}{1-\Gamma_{\lambda/4}} = Z_o \dfrac{1+0.7071\angle -135^\circ}{1-0.7071\angle -135^\circ}$

$= Z_o (0.4472\angle -63.435^\circ)$

$Z_{in,\lambda/4} = (0.2 - j0.4)Z_o$