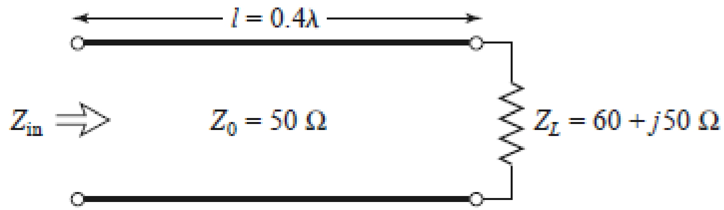
1 Use the Smith chart to find the following quantities for the transmission line circuit shown in the accompanying figure:

(a) The SWR on the line.
(b) The reflection coefficient at the load.
(c) The load admittance.
(d) The input impedance of the line.
(e) The distance from the load to the first voltage minimum.
(f) The distance from the load to the first voltage maximum.



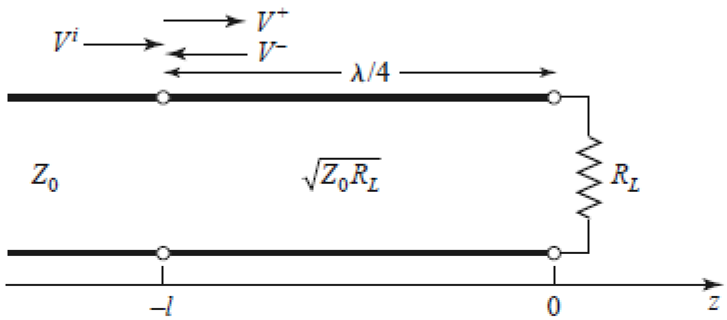
2 Use the Smith chart to find the shortest lengths of a short-circuited 75Ω line to give the following input impedance:

(a) $Z_{in} = 0$.
(b) $Z_{in} = \infty$.
(c) $Z_{in} = j75\ \Omega$.
(d) $Z_{in} = -j50\Omega$
(e) $Z_{in} = j10\Omega$

3 Repeat Problem 2 for an open-circuited length of 75Ω line.

4 A slotted-line experiment is performed with the following results: distance between successive minima = 2.1 cm; distance of first voltage minimum from load = 0.9 cm; SWR of load = 2.5. If $Z_0 = 50\ \Omega$, find the load impedance.

5 Consider the quarter-wave matching transformer circuit shown in the accompanying figure. Derive expressions for V^+ and V^-, the respective amplitudes of the forward and reverse traveling waves on the quarter-wave line section, in terms of V^i, the incident voltage amplitude.



[6] A 50 Ω transmission line is matched to a 10 V source and feeds a load $Z_l = 100$ Ω. If the line is 2.3 λ long and has an attenuation constant $\alpha = 0.5$ dB/λ, find the powers that are delivered by the source, lost in the line, and delivered to the load.

Good Luck

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