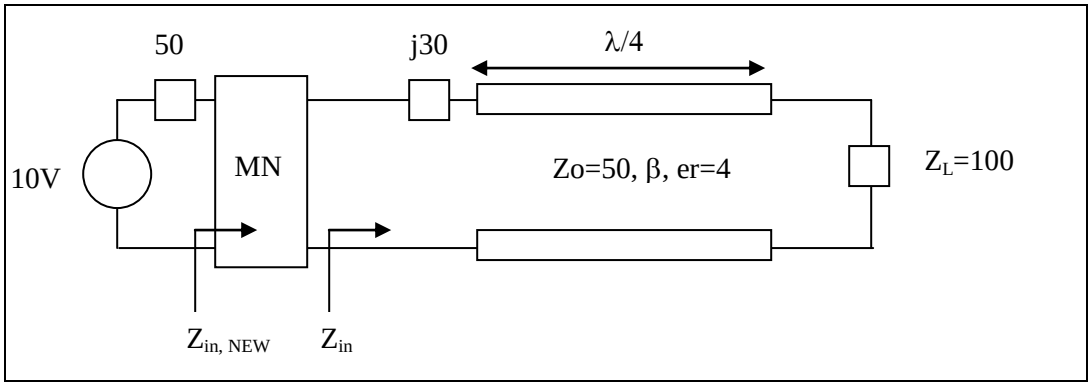
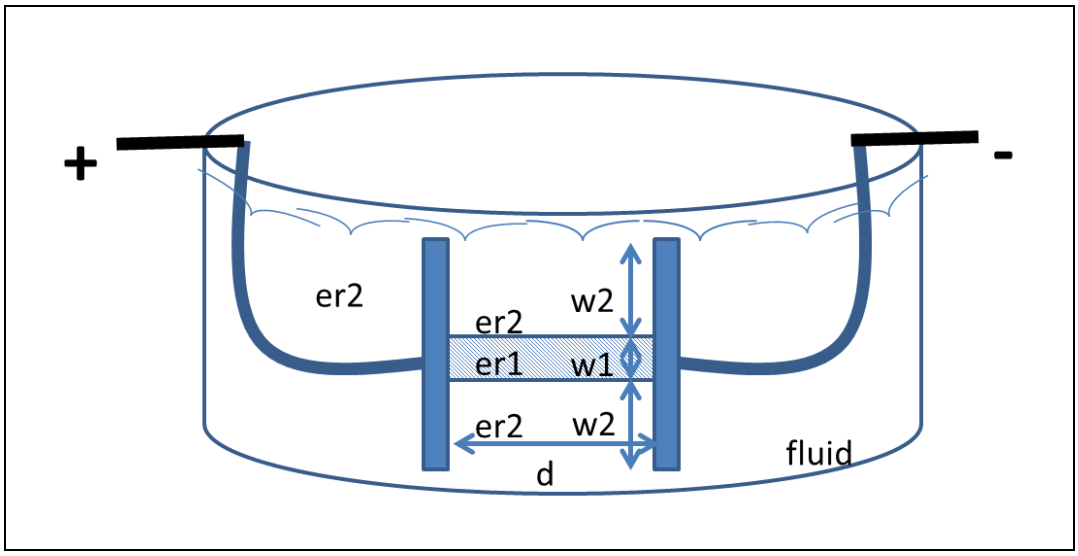


1. 50% -Determine the input impedance (Z_{in}) of the above circuit. Next, design a matching circuit network (MN) using shunt stubs only match the input impedance (Z_{in}) to a 50 ohm generator impedance at the position, new input impedance ($Z_{in, NEW}$). All impedances are in ohms and the reference impedance is 50 ohms.



2. 50% - Determine the dielectric constant of an unknown solution (er2) if the resonant frequency is 800 MHz using the capacitor model with the leads above is used. Assume the capacitor plate area is 1 cm^2 and the plate separation (d) is 1mm. The width (w1) of the known dielectric (er1=4) is 0.2 cm. The inductance associated with each lead is 1nH/lead, having a total system inductance of 2nH. In your solution, include a drawing of the equivalent circuit for this problem and define the individual and total capacitance values used to determine the unknown dielectric constant (er2). The permittivity of air is 8.85×10^{-12} F/m.

The Complete Smith Chart

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