

Indian Institute of Technology, Delhi
ELL112/EEL 202: Circuit Theory
Tutorial 8, September 23, 2014

1. A transmission line of characteristic impedance Z_0 , and length d , is terminated with an impedance Z_L . What is the expression for the input impedance? (Refer to Fig. 1.)
2. If Z_L is an open circuit, find the expression for the input impedance. If Z_L is a short circuit, find the expression for the input impedance.
3. Find the scattering matrix of a transmission line of length l , characteristic impedance Z_0 , wave velocity of c .
4. A circuit is designed using an open circuit stub and a short circuit stub, as shown in Fig. 2. (An open circuit stub is a transmission line of characteristic impedance Z_0 terminated with an open circuit. Likewise, a short circuit stub is a transmission line terminated with a short circuit.) Find the system transfer function, $H(j\omega)$ as a function of ω . (The wave velocity is 3×10^8 meters/second.)

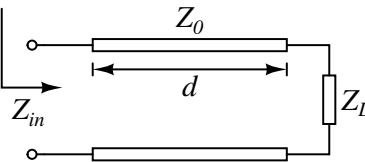


Figure 1: Transmission line of length d terminated with Z_L .

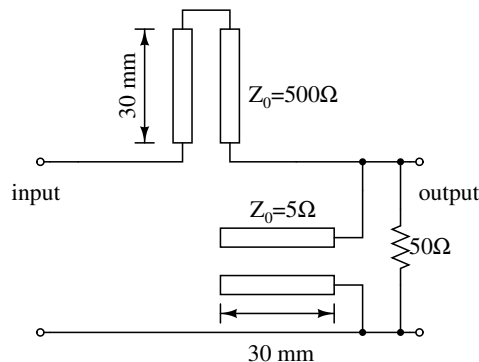


Figure 2: Circuit using open and short stubs.