

ENEL 476 – Winter 2018

Written Assignment #3

Due Friday April 13, 2018 (drop box on 2nd floor of ICT or via D2L)

A transmission line with $Z_o=50\ \Omega$ is connected to a load of $Z_L=20-j20\ \Omega$. The frequency of operation is 1 GHz, and the velocity of propagation on the line is $0.9\ c$ (where c is the speed of light in free space).

- a) Design a series stub tuner to match the load to the line. Select the stub location that is closest to the load. Specify the location of the stub and length of the open-circuited stub required to match the load. Use both wavelengths and physical distance.
- b) Design a shunt stub tuner to match the load to the line. Select the stub location that is closest to the load. Specify the location of the stub and length of the open-circuited stub required to match the load. Use wavelengths.
- c) Design a quarter-wavelength transformer to match the load to the line. Specify the location of the quarter-wavelength transformer relative to the load (in wavelengths), as well as the impedance of the quarter-wavelength line.

Submit the Smith chart that you used to design the tuners and transformer, as well as a summary of the locations and lengths (stub tuners) or location and impedance (quarter-wavelength transformer).