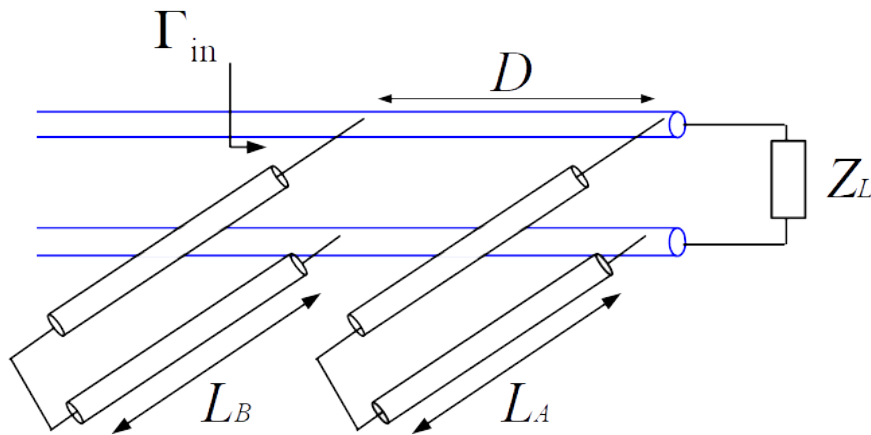


## Wave transmission – MATLAB project 2

### Subject: A double stub matching network and its frequency response

The figure below depicts a double stub matching system, with short-circuited stubs. The line parameters are:  $v_p = 310^8$ ,  $Z_C = 50\Omega$  and the distance between the stubs is  $D = 1.25\text{ cm}$



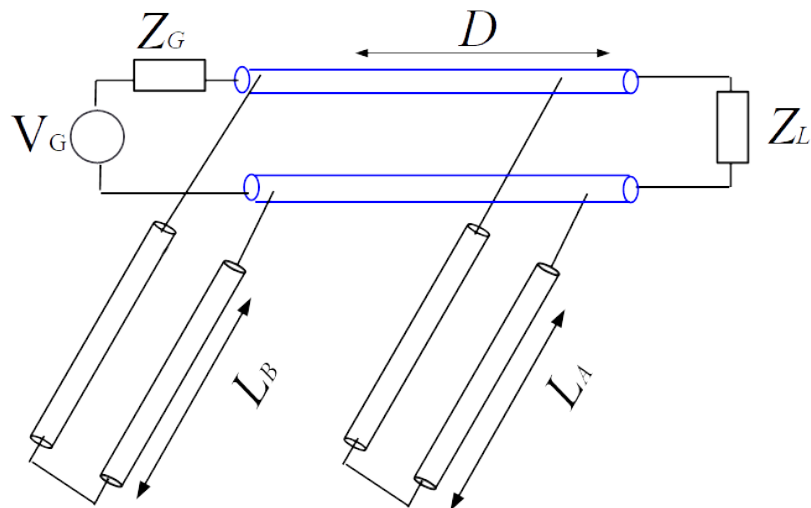
A. For a given load  $Z_L = 100 + jX [\Omega]$ , calculate the stubs lengths  $L_A, L_B$  to eliminate reflections in the main line at frequency  $f_o = 3\text{ GHz}$ .

The value of  $X = 10 \cdot$  times [the modulo-10 sum of your ID digits] (example, if your ID# is 123456, then the sum is 21 and the modulo10 sum is 1)

B. Calculate and plot the input reflection coefficient for the system found in item A, in the frequency range 2 GHz - 4 GHz at steps of 10 MHz.

C. Repeat item B for the same system except that now  $L_A$  is longer by  $\lambda_o / 2$  compared with the value found in item A, where  $\lambda_o$  is the wavelength at  $f_o$ , and compare the results to those of section B.

D. The system is now connected to a generator  $V_G(\omega) = 1V$  with output impedance of  $Z_G = 75\Omega$ . Calculate and plot the power absorbed by the load in the frequency range 2 GHz - 4 GHz for the system found in item A. Explain the results in view of the results of item B.



### Submission Guidelines

1. The project is performed and submitted in pairs, but students who want it may also do it by their own.
2. All answers should be explained.
3. Attach your code at the end of the report.
4. All pairs will be examined on the project. Please bring the hard copy of your report to the exam.