Dept. Electrical and Computer Engineering
The University of British Columbia
EECE560 Network Analysis and Simulation January 2021
Instructor: Dr. J. R. Martí

ASSIGNMENT No. 5

Due Date: 15 March 2021

Rational Fitting of Transmission Line Functions

In this assignment we will use Bode's asymptotic tracing technique to find a rational function approximations to for a tranmsission line characteristic impedance function $Z_c(\omega)$. Use the data in the Data_Assign04.txt file of Assignment 4 for the *zero sequence mode*. To increase the frequency resolution for a better fit, it is suggested to create 10 points per decade by interpolation of the given data points.

1. Find a rational function fit of $Z_c(\omega)$ using only four poles, for the frequency range from 10^{-1} Hz to 10^{7} Hz.

2. Compare the magnitude fit and the phase angle fit. Plot the original function and the rational approximation on the same graph.

3. Obtain the network synthesis of $Z_c(\omega)$ in terms of series blocks of parallel RC branches. Calculate the values of the R's and the C's of these branches.

4. Comment on your results:

   (a) Comment on the magnitude fit and the phase fit.

   (b) What strategy did you use to obtain a good fit?

   (c) Do you have any suggestions on how the procedure could be improved so that you could get a better fit with the same number of poles and zeroes?

   (d) Other comments?