Working in groups of 3, develop a MatLab or spreadsheet calculation tool that performs phasor analysis of long-line behavior. Inputs should be:

- z & y in ohms and S per mile or per meter.
- Length in miles or m.
- Base voltage and MVA.
- Load in complex power $S = P + jQ$.

The program should calculate values for $\gamma, \alpha, \beta, Z_C, \tau,$ and ABCD parameters. Make a plot of the voltage profile (incident, reflected, and total voltage as function of position x) along the entire length of the line. It should be flexible enough so that parameters can be quickly changed and the voltage profile automatically replotted. Demonstrate the Ferranti Rise (increase in receiving-end voltage when receiving end is open-circuited), SIL, and any other steady-state behaviors of long lines that you think are important, i.e. a load that is open circuit, short circuit, inductive, capacitive, etc.

In your report:

- Describe the assumptions made and give some basic documentation of your program implementation.
- Give a brief description of the different operating scenarios that you’ve investigated, along with printouts of the voltage profiles and parameters.
- Make overall recommendations for loading long lines and operation of a system which contains long lines.

Report format: Formal summary report, with attachment of hand calculations. Don’t waste much time with CAD drawings and equation editors. Insert key plots and equations into the report, and attach you hand-calcs, notes, and any additional plots. Include references in your report.