**Çankaya University**
**Electrical & Electronics Engineering Department**
**ECE 324 Power Systems Homework # 1 Due: 8.4.2018**

1- Consider the circuit shown in Figure 1 in time domain. Convert the entire circuit into phasor domain.

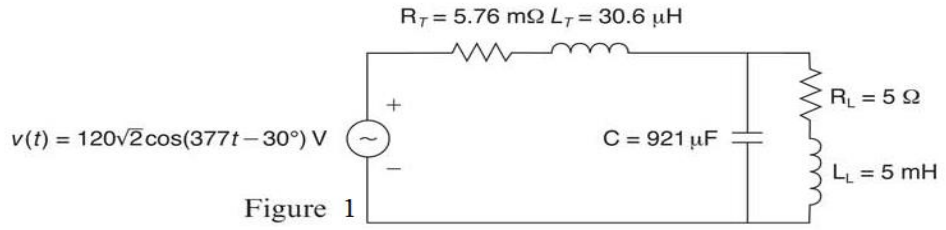

Figure 1

2- Modeling the transmission lines as inductors, with $S_{ij} = S_{ji}^*$, Compute $S_{13}$, $S_{31}$, $S_{23}$, $S_{32}$, and $S_{G3}$ in Figure 2 (*Hint:* complex power balance holds good at each bus, satisfying KCL.)

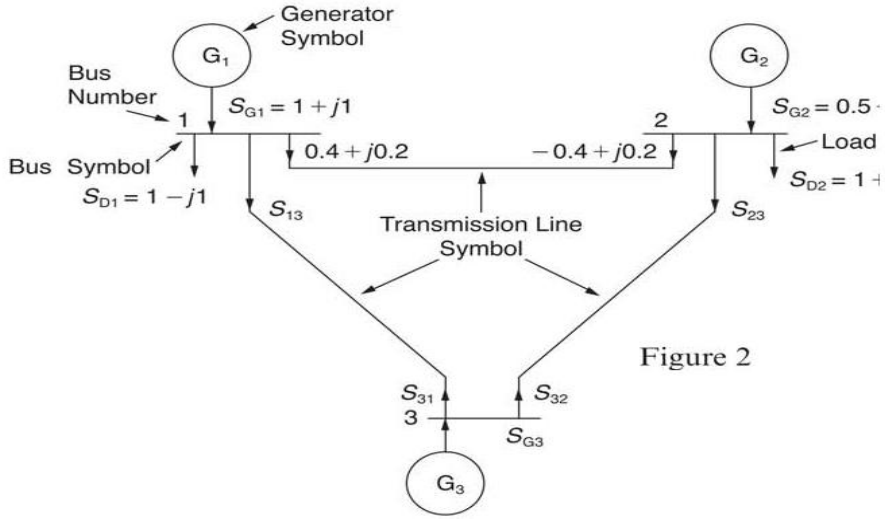

Figure 2

3- For the circuit shown in Figure 3 , convert the voltage sources to equivalent current sources and write nodal equations in matrix format using bus 0 as the reference bus. Do not solve the equations.

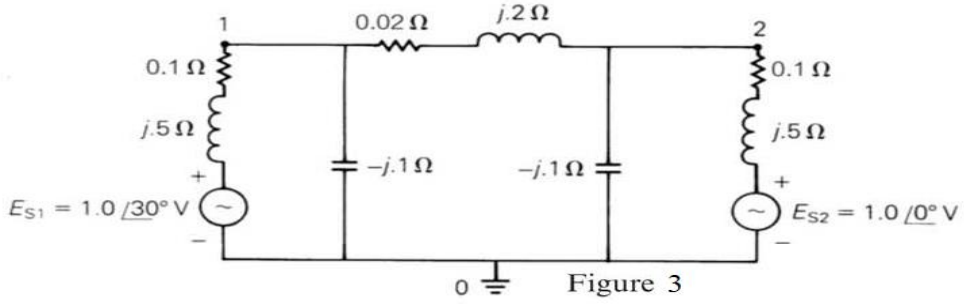

Figure 3

4- Determine the $4 \times 4$ bus admittance matrix $\boldsymbol{Y}_{bus}$ and write nodal equations in matrix format for the circuit shown in Figure 3 . Do not solve

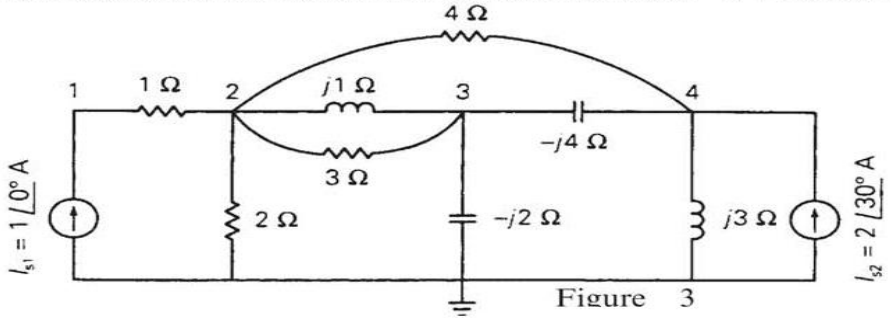

Figure 3