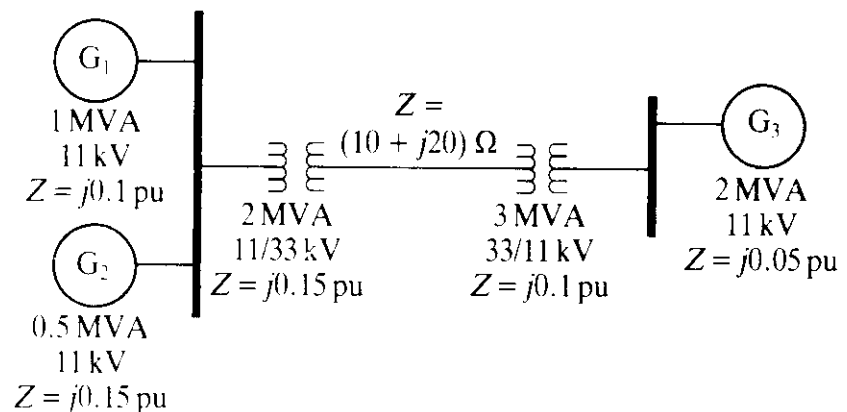


## ECE 3600 homework # 10

1. A 3-phase system operates at 220 kVA and 11 kV. (Values given in this way are 3-phase power and  $V_L$ , also recall that  $V_L$  is  $V_{LL}$ ). Using these quantities to find base values, find the base current and base impedance for the system.
2. 2.19 If  $25 \Omega$  and 125 A are the base impedance and base current, respectively, for a system, find the base kVA and base voltage.
3. 2.20 The percent values of the voltage, current, impedance, and voltamperes for a given power system are 90, 30, 80, and 150 percent, respectively. The base current and base impedance are 60 A and  $40 \Omega$ , respectively. Calculate the actual values of the voltage, current, impedance, and voltamperes.
4. 2.21 A single-phase transmission line supplies a reactive load at a lagging power factor. The load draws 1.2 pu current at 0.6 pu voltage while drawing 0.5 pu (true) power. If the base voltage is 20 kV and the base current is 160 A, calculate the power factor and the ohmic value of the resistance of the load.
5. 2.25 A 100-kVA, 20/5-kV transformer has an equivalent impedance of 10 percent. Calculate the impedance of the transformer referred to
  - a) the 20-kV side
  - b) the 5-kV side.

6. 2.23 The one-line diagram for a two-generator system is shown. Redraw the diagram to show all values as per-unit values referred to a 7000-kVA base. See the transformers for the  $V_{base}$ s in the 3 regions.

$$S_{base} := 7 \cdot \text{MVA}$$



### Answers

1. 6.35 kV      11.6 A      550  $\Omega$
2. 390.6 kVA      3.125 kV
3. 2160 V      18 A  
32  $\Omega$       216 kVA
4. 69.4 %      43.4  $\Omega$
5. 400  $\Omega$       25  $\Omega$

