ECE 330 homework assignment #1 (In class quiz – Fri, Sep 8)

Text problem 2.1 (Partial answer: 0.707 leading)

Text problem 2.2 (Partial answers: -250, -500, 500, 0, 150, 1900, -150)

Text problem 2.8

Text problem 2.9

Text problem 2.10 (Partial answer: 100 Amps)

Text problem 2.11

Special problem #1

A single-phase source is supplying passive loads through two wires (typically called a feeder). The impedance of each wire is 0.05 + j 0.05 Ohm. The load is connected between the two wires at the far end. The load current (which is also the feeder current) is 75 Amps (RMS).

a) What is the source voltage that you need in order to have 120 Volts (RMS) across the load when the power factor of the load is unity? (Answer: 128V)
b) Repeat for the case where the load power factor is 0.707 lagging (Answer: 131V).
c) Repeat for the case where the load power factor is 0 leading (Answer: 113V).

Special problem #2

Three single-phase loads are connected in parallel across a 60Hz source of 240 Volts.

Load #1: 6 KVA at 0.8 power factor lag
Load #2: 4 KW at 0.9 power factor lag
Load #3: 13 Amps at unity power factor

a) Find the total complex power consumed by these three loads.
b) Find the source current magnitude (Answer: 54.76 Amps)
c) Find the value of capacitive VARS that should be added in parallel to these three loads to make the overall power factor 0.95 lag. (Answer: 1,619 Vars)