EECE325 Fundamentals of Energy Systems   Spring 2023
Dr. Charles Kim

Homework 2 100 points(25 points each)

A. INSTRUCTION

(a) Due: by 8:00pm Wed Feb 22
(b) Scoring rubric for each problem:
   25   Correct answer with detailed calculation displayed
    10   Incorrect answer with detailed calculation displayed
    5   Correct answer without calculation displayed
    0   Incorrect answer without calculation displayed
(c) Late submission: Max score is reduced by 10% for each day
after the deadline.
**(d) If any two or more submitted works are (almost) identical,
all such works will be considered as cheated ones, and are
subject to 0 point first and then to possible additional
disciplinary action from the university.**

B. PROBLEMS

**1. Calculate the magnitude of a line current in the
circuit shown below.**
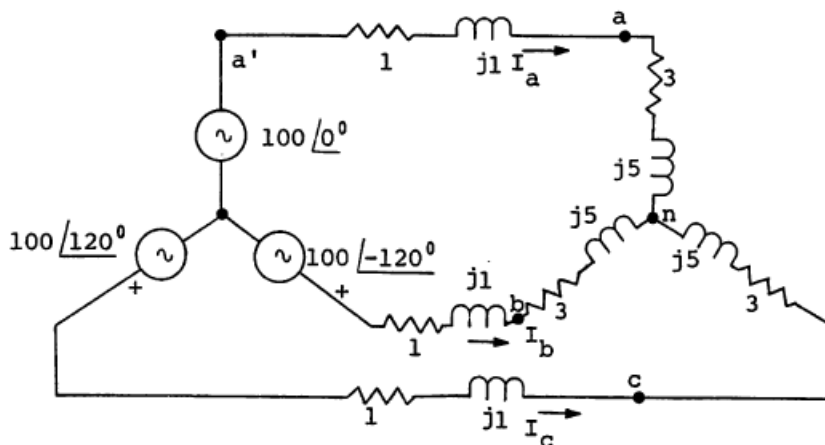
2. A balanced 3-phase source supplies two balanced Y-
connected loads. The first load has a lagging pf of 0.8
and its 3-phase real power is 6 kW. The other load has
a leading pf or 0.833 and its 3-phase real power is 12
kW. If the magnitude of the current at each line is 8A

rms, find the current in the (a) first load and (b) second load.

3. A balanced 3-phase system has a delta-connected load with a 50 Ω resistor, a 5 μF capacitor, and a 0.56 H inductor in series in each phase. With **V**an=390 ∠0 and ω = 500 rad/sec, find the line current of each phase.

4. Two balanced 3-phase loads are connected in parallel. Load 1 has a lagging pf of 0.5 and its 3-phase real power is 20 kW. The load 2 has a lagging pf of 0.5 and its 3-phase real power is 15 kW. The line voltage at the terminals of the load is 440 V rms. The load terminals are connected to the source terminal by means of cables which have an impedance of 1+j3 Ω each. Calculate (a) the line current; (b) the line voltage at the terminals of source; and (c)the power factor at the load terminals.