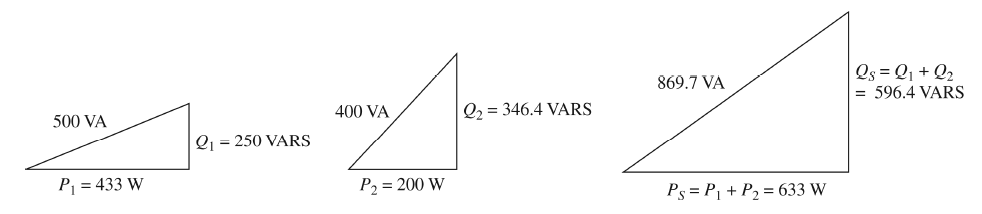
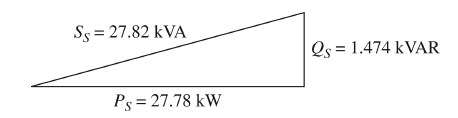
**Chapter 2 suggested homework problems - solutions**

2.20 Note: you can also use the admittance (Y) form of the loads to do your calculations. In this case you would have S = |V|2Y. If using the impedance form (below), remember that you must conjugate the impedances before dividing!

These power triangles are copied from the author’s solutions, so the numbers may be a little different than mine:



2.24



One of the most difficult quantities to obtain is reactive power, when given real power and power factor. There is a handy equation for this (used above):

Note that is the “apparent power” |S| and cos-1(pf) is the power angle in degrees

2.27

Since we are given the load in terms of P and pf, we need to find Qold:

We can use the same formula to find the corrected value of Qnew, because P does not change:

2.30

By this time, you should be able to figure out how to combine the loads. Here is the total you get:

Thus, we have corrected the system to where it is drawing 75A instead of 100A!

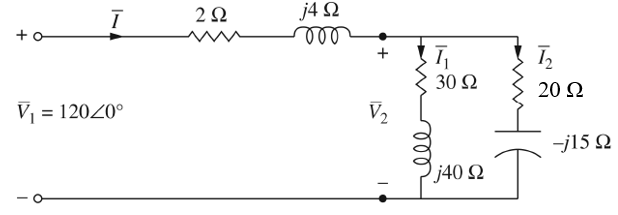
2.37

Note that a current source (IS1) in series with a resistor introduces a trivial row to the 4x4 system. Once everything is calculated, you should get approximately the following:

2.43

The second load is delta connected, so we need to change it to a wye equivalent by dividing by three:

The voltage source is line-to-line, so it needs to be divided by root 3. We can also arbitrarily reference the source voltage to 0° phase. Once this is done, we have the following single-phase equivalent circuit:



To find the voltage at the load, we need to calculate the voltage drop on the line:

2.51 Here is one more good practice problem for 3-phase circuits.

The strategy here is:

* Find single phase equivalents of each load
* Find the load currents per phase
* Add up the current to find a single-phase line current
* Work backward to find the wye-equivalent voltage at the sending end
* Convert to a line voltage at the sending end

Now we can find each load current and the total current:

This is the line current flowing in each phase.