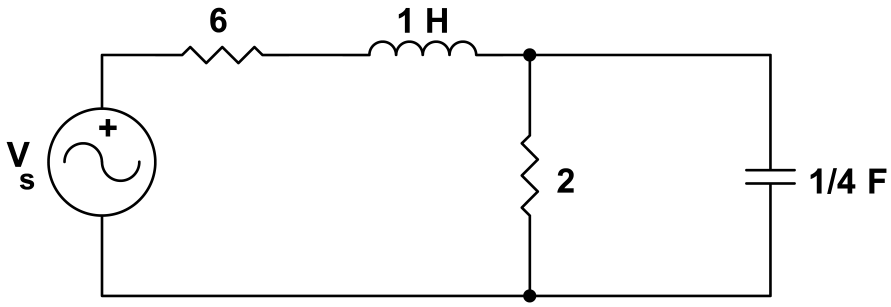
ECE 2350 CIRCUIT ANALYSIS I

Homework 12
21 April 2020

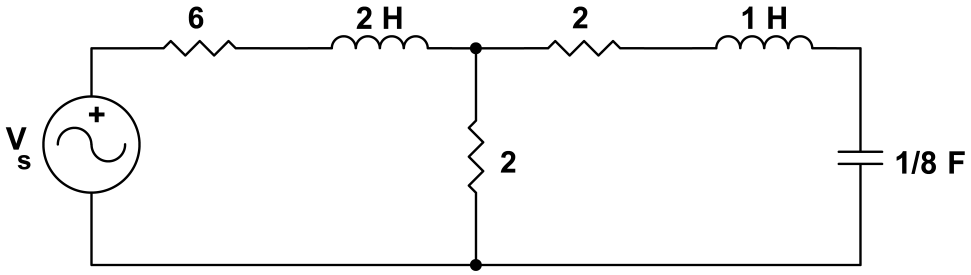
Professor Dunham
Due: 30 April 2020

Review Lecture Notes.

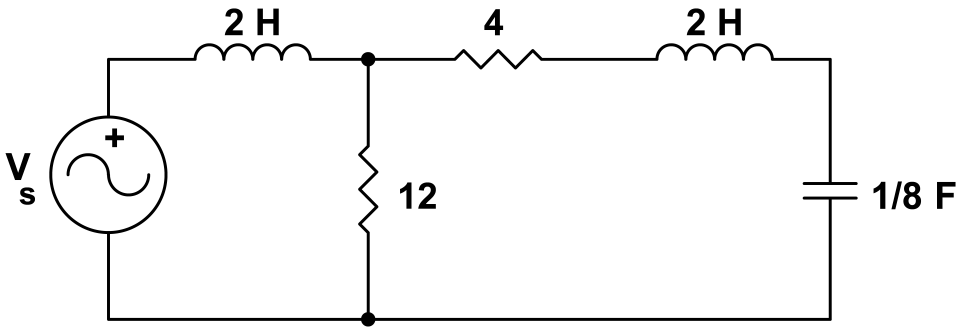
1. In the circuit shown below, find the real power, the reactive power and the complex power given that $v_s(t) = 10\cos(2t)\,\mathrm{V_{rms}}$.



2. In the circuit shown below, find the power delivered by the source and the power absorbed by the $6\,\Omega$ resistor given that $v_s(t) = 18\cos(2t)\,\mathrm{V}$.

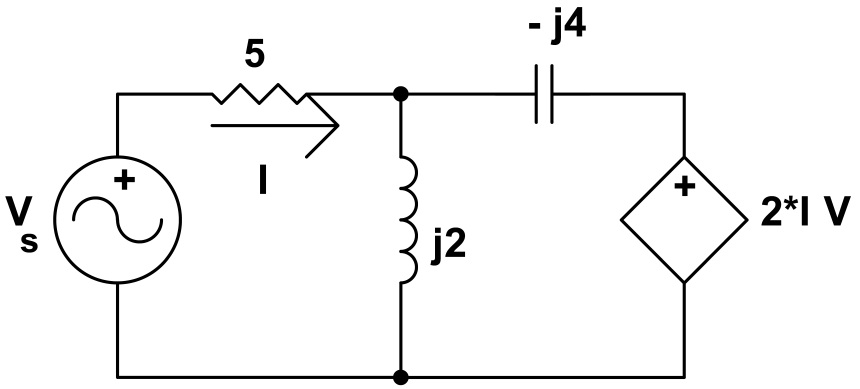


3. In the circuit shown below, find the power factor seen from the terminals of the source and the reactance necessary to connect in parallel with the source to change the power factor to unity given that $v_s(t) = 10\cos(2t)\,\mathrm{V}$.



4. Three parallel passive loads, $\mathbf{Z}_1$, $\mathbf{Z}_2$ and $\mathbf{Z}_3$, are receiving complex powers of $3-j4$, $2+j5$ and $3+j5$ VA, respectively. If a voltage source of $20\angle 0^\circ\,\mathrm{V_{rms}}$ is connected across these loads, find the rms value of the current that flows from the source and the power factor seen by the source. What complex power could be added in parallel to the three passive loads to bring the power factor of the source to 0.95 lagging?

5. In the circuit shown below, find the complex power delivered by the source and the power factor seen by the source, given that $10\angle 0^\circ\,\mathrm{V_{rms}}$.



6. If an active ac port yields $\mathbf{V} = 120\angle 0^\circ\,\mathrm{V}$ when open circuited and $\mathbf{V} = 60\angle 16.26^\circ\,\mathrm{V}$ when terminated on a load of $30+j40\,\Omega$, find the load that will absorb the maximum average power from this ac port, and find this power.