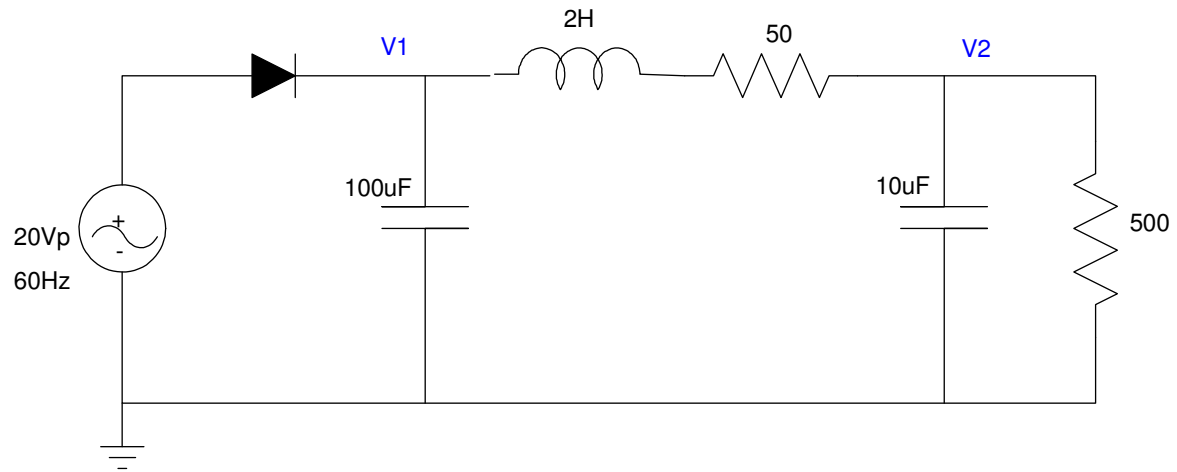


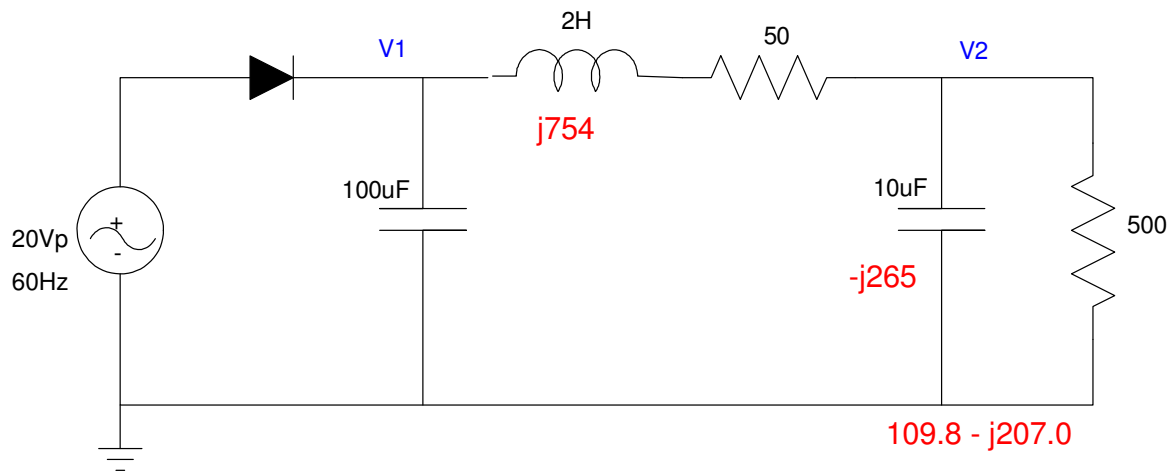
# ECE 320: Handout #8

## AC to DC Converters

Determine the DC and AC voltages at V1 and V2. Assume ideal silicon diodes



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The peak voltage at V1 = 20 - 0.7V (diode) = 19.3V

The current is (worst case)

$$I = \left( \frac{19.3V}{550\Omega} \right) = 35.09mA$$

The ripple at V1 is then

$$I = C \frac{dV}{dt}$$

$$35.09mA = 100\mu F \frac{dV}{1/60s}$$

$$dV = 5.848V_{pp} = V1(AC)$$

The DC voltage at V1 is

$$V_1(DC) = 19.3V - \frac{1}{2} \cdot 5.848V_{pp}$$

$$V_1(DC) = 16.38V$$

The DC voltage at V2 is

$$V_2(DC) = \left( \frac{500}{500+50} \right) \cdot 16.38V$$

$$V_2(DC) = 14.89V$$

The AC voltage at V2 is

$$V_2(AC) = \left( \frac{(109.8-j207.0)}{(109.8-j207.0)+(50+j754)} \right) \cdot 5.484V_{pp}$$

$$V_2(AC) = 2.255V_{pp}$$