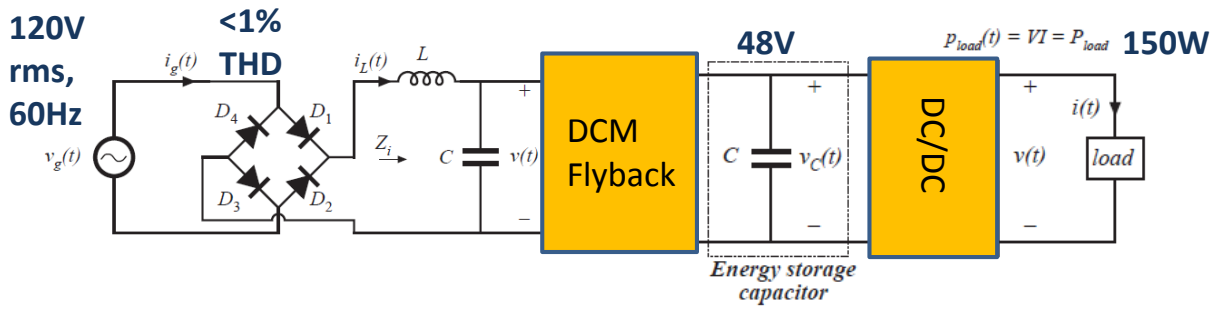
Part II DCM Flyback Energy Storage and Control Loop Bandwidth:

120 Vrms Input Voltage	**60 Hz Input Frequency**	**48Vdc Intermediate Voltage**	**150 W Output Power**	**<1% THD**



DC/DC Converter Description:

Assume the output of the DC to DC converter (**Buck Converter**) is tightly regulated such that v(t)=V=5V. The maximum duty cycle of the PWM controller for the DC/DC converter is limited to 0.98. Assume the efficiency of the buck converter is 90% and 150W is the **output** power of the buck converter.

Project Part II Tasks:

1: With this information along with the parameters given in the final part I description, calculate the absolute **minimum** energy storage capacitor required to provide full power to the load in the event that the input voltage drops out for 3 input line cycles.

2: Assuming the PWM controller uses a reference voltage of 2.5V and a saw tooth generator has a peak to peak amplitude of 2V, design a PI controller as described in the lecture video such that the output voltage is regulated to 48V with a bandwidth that does not allow more than **3%** THD. For the voltage sensor H(s), apply a low pass filter with a corner frequency of 1/10 the switching frequency to filter switching ripple.

3: Perform an end to end simulation to steady state using the constant power load for the DC to DC converter.

4: Once steady state has been reached, perform a step response from full load to half load.

5: Perform another end to end simulation. Simulate a **2 line cycle** (sized for 3) power outage after steady state has been reached. You can do this by multiplying the input voltage source by a step function where you set the amplitude of the step function to step from 1 to 0.01 after steady state has been reached. Use another step function to return the input voltage from the outage after the 2 line cycles of drop out condition.