EE394V Homework Assignment #4

Due date: 11/14/2012

For all questions elaborate some few conclusions or comments about the results. For all questions with simulations include a graph with the used model. State all the assumptions considered in the simulations. You are free to do as many assumptions you consider necessary.

1)   Calculate the output capacitance for a single-phase full wave rectifier so the output voltage ripple is 5% of the peak input voltage. Assume that you have a 15 A load current and your input voltage is 120 Vrms. Consider both the cases of an input frequency of 60 Hz and 400 Hz. In both cases also calculate the input current THD and power factor.

2)   Obtain the switching signal for one of the switches of a single-phase H-bridge inverter in which the switching frequency is 27 times the input frequency and the case of a modulation index of 0.9 and 0.5. Plot the output voltage spectrum up to 2 times the switching frequency for a purely resistive load. Please, repeat for a switching frequency 81 times the fundamental.