EE394V Homework Assignment #4

Due date: 11/23/2011

For all questions elaborate some few conclusions or comments about the results. For all questions you are free to make further, but logical, assumptions you consider necessary

1) Consider a buck-boost converter with L = 500 μH, C = 1 mF, R = 10 Ω, E = 30 V. Simulate an hysteresis control that achieves a voltage output of 40 V with a current ripple of 1 Amp. Plot the state variables in time domain and on a phase portrait.
2) Now, try regulating the output with a PI controller. For the PI controller choose some suitable gains and simulate the resulting system. Plot the state variables in time domain and on a phase portrait.
3) Consider a buck converter with L=500 μH, C= 1000 μF, E = 20V, and a constant-power load of 50 W. Now simulate the buck converter with a PID controller with kd=0.001, kp=0.01, and ki=1. What happens if you make kd=0?