UNIVERSITY OF TEXAS AT DALLAS
Department of Electrical Engineering
EE/CE 3311 – Electronic Circuits
Assignment III

Date assigned: 9/24/2012
Date due: 10/1/2012

Problem 3.1
Beginning with $V_{D,on}$=800 mV for each diode, determine the change in V_{out} if I_{in} changes from 3mA to 3.1mA for the circuits shown below. Hint: First solve the circuits with constant voltage model. Then, apply small signal to determine the change in the output voltage.


(a)   (b)

Problem 3.2

Consider Fig 3.43 in the textbook so as to appreciate the regulation provided by the diodes. For simplicity you can neglect the load. Assume that $f_{in} = 60\ Hz$, $C_1 = 100\mu F$, $R_1 = 1000\Omega$, and the peak voltage produced by the transformer is equal to 5V.
a) Estimate the ripple amplitude across C_1 by assuming that R_1 carriers a relatively constant current and $V_{D,on}$=800 mV for each diode.
b) Determine the ripple amplitude across load by using the small-signal model of the diodes.
c) Compute the line regulation of the circuit.
Problem 3.3
Assuming $V_{in} = V_p \sin wt$, plot the output waveform of the circuit shown below for an initial condition of 0.5V across C_1. You can assume $V_p = 5V$.
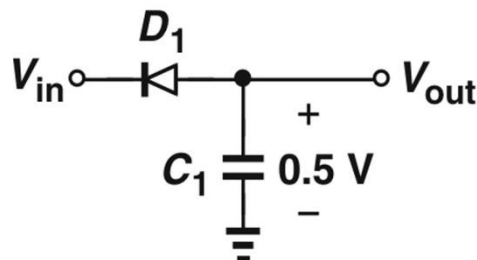
Problem 3.4
Suppose the rectifier drives a 100 ohm load with a peak voltage of 3.5 V. For a $1000\mu F$ smoothing capacitor, calculate the ripple amplitude if the frequency is 60 Hz.