

King Fahd University of Petroleum and Minerals
Department of Electrical Engineering

EE Power Electronics Project # 2

Design of a DC Chopper

I. Design of an AC/DC converter with the following the specifications:

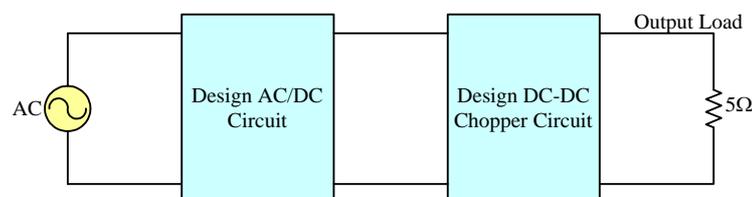
- AC supply voltage $V_S = 120$ V (rms), 60 Hz.
- The DC output voltage $V_{01(dc)} = 48$ V.
- The ripple factor of the output voltage $RF_V \leq 5\%$.

II. Design of step-down DC chopper with the following specifications:

- Switching (or chopping) frequency, $f_s = 20$ kHz.
- Dc input supply voltage $V_S = 48$ V dc, where as the source available is an ac with 120 V (rms).
- Load resistance $R = 5 \Omega$.
- The DC output voltage $V_{02(dc)} = 12$ V.
- The peak-to-peak output ripple voltage, $\Delta V_C \leq 2.5\%$.
- The peak-to-peak inductor ripples current, $\Delta I_L \leq 5\%$.

III. Calculation for both circuits:

- (a) Determine the values of L_e and C_e for the output LC-filter.
- (b) Determine the (peak and rms) voltage ratings and the (average, rms, and the peak) current for all components and devices.
- (c) Verify your design calculation by using Pspice simulation.



The project will be due on Wednesday January 16, 2008.