6.334 Power Electronics
Spring 2007

6.334 Power Electronics   Issued: April 31, 2007

Problem Set 10   Due: May 7, 2007

Reading: KSV Chapter 4

Problem 10.1

Consider a continuous conduction mode buck converter to be operated under peak current mode control. The converter parameters are fsw = 500 kHz, L = 16 µH, C = 800 µF, and Vout,ref = 24 V. What is the smallest magnitude of compensating ramp that will yield stable dynamics for the ripple instability over an input voltage range of 36 V < Vin < 75 V?

Note: Models for computing the ripple dynamics will be discussed in class. They can also be found in: H. Hsu, A. Brown, L. Rensink, and R.D. Middlebrook, "Modeling and Analysis of Switching dc-to-dc Converters in Constant-Frequency Current-Programmed Mode," 1979 IEEE Power Electronics Specialists Conference, pp. 284-301, *and in* R.W. Erickson, Fundamentals of Power Electronics, Boston: Kluwer, 1997, Chapter 11 (Current Programmed Control).

Problem 10.2   KSV Prob. 4.6

Problem 10.3   KSV Prob. 4.7

Problem 10.4   KSV Prob. 4.8