ECE 214 - Virtual Lab #10
Thévenin Equivalent Circuits
Modified for Analysis Only

17 April 2020

Introduction: In this lab, you will examine the Thévenin equivalent output impedance of the DC-DC Power Supply designed in Lab #9.

Circuit Analysis:

1. For the DC-DC Power Supply of Lab #9, derive the equations for the Thévenin equivalent output impedance under each of the two operating conditions below.
   (a) Condition 1: the D and S terminals of the transistor in the Boost Converter are shorted. All of the current flowing through the inductor also flows through the transistor.
   (b) Condition 2: the D and S terminals of the transistor in the Boost Converter are open. All of the current flowing through the inductor flows onto the capacitor.
2. Plot the following on a semi-log graph.
   (a) The magnitude of the Thévenin equivalent output impedanace as a function of frequency for frequencies between 1 Hz and 1 MHz for both operating conditions described in step 1.
   (b) The phase angle of the Thévenin equivalent output impedance as a function of frequency for frequencies between 1 Hz and 1 MHz for both operating conditions described in step 1.
3. Discuss the results of this analysis.