Extra Credit Problem #1:

An ideal boost converter is shown in Fig. 1.

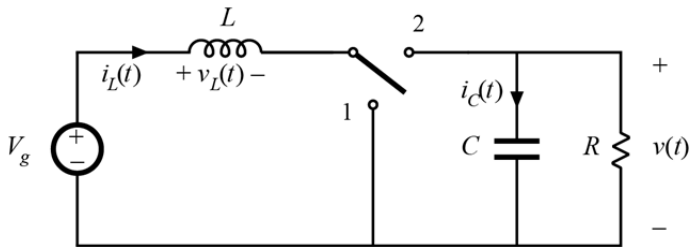

Fig. 1: Ideal Boost Converter

For the converter operating in steady-state, derive *exact* (i.e. without approximation) analytical expressions for the following in terms of the circuit parameters V_g, R, T_s, L C and duty cycle D.

a) The DC component of the output voltage
b) The peak-to-peak inductor current ripple
c) The peak-to-peak capacitor voltage ripple

No partial credit will be awarded. Answers which employ the small-ripple approximation will not receive credit on this problem.