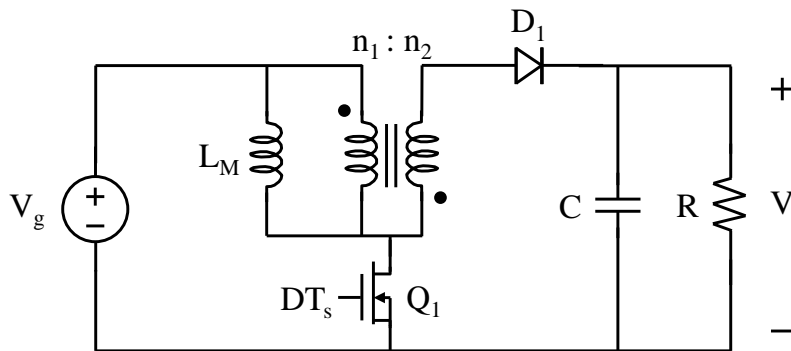


**Problem 6.1 (50 points)**

Consider the converter shown below that includes an  $n_1:n_2$  turns ratio transformer. The magnetizing inductance of the transformer,  $L_M$ , is explicitly shown. Note that the purpose of the transformer in this converter is not to provide galvanic isolation, but instead to provide an additional means to set the conversion ratio. Assume that the converter is lossless and operates in continuous conduction mode (CCM) with duty ratio  $D$  and time period  $T_s$ .



- Determine an analytical expression for the conversion ratio  $M (\equiv V/V_g)$  of this converter.
- Sketch  $M$  versus  $D$  for two cases: (i)  $n_2 = n_1$  and (ii)  $n_2 = 0$ .
- Which well-known converter does this converter reduce to when  $n_2 = 0$ .

**Problem 6.2 (50 points)**

Do Textbook (Fundamentals of Power Electronics 2<sup>nd</sup> Edition) Problem 6.5 part (a) only (pg. 180).

**Problem 6.3 (50 points) [Additional problem only for ECEN 5797 students]**

Do Textbook (Fundamentals of Power Electronics 2<sup>nd</sup> Edition) Problem 6.5 part (b) (pg. 180).