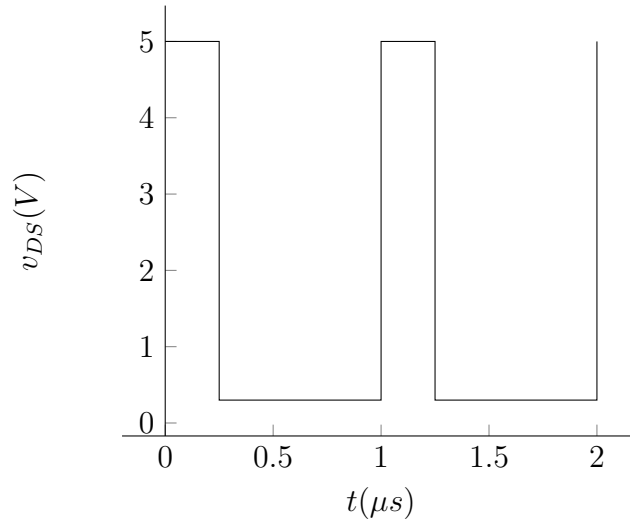


- a) What is the duty ratio, D , of the converter?

The duty ratio is $D = \frac{V_{IN}}{V_{OUT}} = \frac{5}{20} = \frac{1}{4}$.

- b) Sketch the waveform of the MOSFET drain-to-source voltage, v_{DS} . Label the numerical values of all relevant times and voltages.

First we assume that the MOSFET is off, we see that $v_L = 0$ and v_{DS} must be V_{IN} . We can then set the MOSFET on, the voltage at this point becomes $0.3V$. Or the voltage $V_{GS} - V_{TH}$.



- c) Find the DC component of the voltage waveform of art (b). How does this value relate to the value of V_{IN} ? Does this make sense and why? The DC component of thi waveform is $1.25V$. V_{IN} is $5V$, this makes sense because much of the power is lost in the transistor.