ElecEng 2EI4
Assignment 2 Problem Definition

Joshua Obljubek-Thomas

400506256

As a future member of the engineering profession, the student is responsible for performing the required work in an honest manner, without plagiarism and cheating. Submitting this work with my name and student number is a statement and understanding that this work is our own and adheres to the Academic Integrity Policy of McMaster University and the Code of Conduct of the Professional Engineers of Ontario. **Submitted by Joshua Obljubek-Thomas**

Idealities and associated Non-idealities

One ideality of a switch is the ability for it to close completely. This means the switch should be able to have an infinite resistance when closed and there is no current from VA -> VB. The non-ideality associated with this ideality is that it is not possible to have an infinite resistance, thus there will always be some current Ioff.

Another ideality of a switch is the ability for it to open completely. This means that the switch should have no resistance and VA = VB. The non-ideality associated with this ideality is that it is impossible to have no resistance across the two terminals in this type of circuit and a value of Ron is used to measure this non-ideality.

Another ideality of an ideal switch is that it should be bidirectional. With the circuits we have been using in RC/RL circuit analysis, there are many times when the current reverses across the switch. However, the non-ideality associated with this ideality is that the switch cannot be perfectly bidirectional. The voltage drop Von in one direction will be different than Voff in the other. Furthermore, Ioff in one direction will be different than Ioff in the other direction assuming the voltages just switch.

The final ideality of an ideal switch is that it should work for all values of Va and Vb as we have been assuming in RC/RL analysis. However, the MOSFETs used to create the electrically controlled switch do not allow for this ideality. The non-ideality associated with this switch is that the switch will operate over a certain voltage. So the voltages must be within $V_{min} < V < V_{max}$.