



$$U_{R_1} = U_{(D_1-D_0)} - U_{LED_1} = 9V - 1.8V = 7.2V \quad (3)$$

This ensures that the energy supplied by the controller is completely used by the resistor and led. Kirchhoff's voltage rule is instrumental in analyzing and designing circuits for energy efficiency and proper component operation in robotics.

Understanding the basic principles of electricity and electronics, epitomized by Ohm's Law and Kirchhoff's rules, is crucial for anyone venturing into robotics. These principles not only guide the design and analysis of robotic systems but also ensure their safe and efficient operation. By applying these laws, we can predict how circuits will behave under various conditions, optimize energy consumption, and troubleshoot potential issues, laying the groundwork for more advanced explorations into the electrifying world of robotics.

#### 4.4.1 Questions

1. Calculate the voltage across resistor  $R_2$  when voltage potential of  $V_{D0} = 0V$  and voltage potential of  $V_{D1} = 9V$ !
2. What is the voltage across resistor  $R_3$  if we measured voltage potential  $V_{A_0} = 2V$  at the input pin  $A_0$ ?