ECE 4784 Modeling Project Phase 1: Hodgkin Huxley Model

Summary

The Hodgkin Huxley Model is a method of simulating the mechanics of a cellular membrane voltage and its related ion currents via a parallel-conductance electrical circuit. Via this method, the movement of ions can be regarded as analogous to electrical current in traditional circuit. It models the ion permeability of the principle selective ion channels via a set of electrical conductances, and interprets the membrane capacitance as a single capacitor. Because the conductances of sodium and potassium channels are gated according to the overall membrane voltage, a set of appropriately curve-fitted gating probability variables (n, m, h) are used to tune the conductances. The capacitance of the cell membrane arises due to the difference in charge between the interior and exterior of the cell, creating an electric field in the plasma membrane, which serves a dielectric.