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Computational Simulation of a Simple Pendulum Driven by a Natural Chaotic Function TREVOR TOMESH, University of Wisconsin - River Falls — A simple pendulum is computationally modeled and driven according to the natural non-linear dynamical functions that arise out of the Hodgkin-Huxley membrane model of squid giant axons. Driving a neural membrane with a sinusoidal current can stimulate chaotic potential oscillations that can be modeled mathematically. The solution of the Hodgkin-Huxley membrane model provides the amplitude of the impulse to the simple pendulum at the lowest point in its swing. The phase-space plot of a simple harmonic oscillator, randomly driven chaotic oscillator, and Hodgkin-Huxley driven chaotic oscillator are compared. The similarities and differences between the motion of the pendulum as the result of the Hodgkin-Huxley driving impulse and a random impulse are explored.

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