Lab Eight

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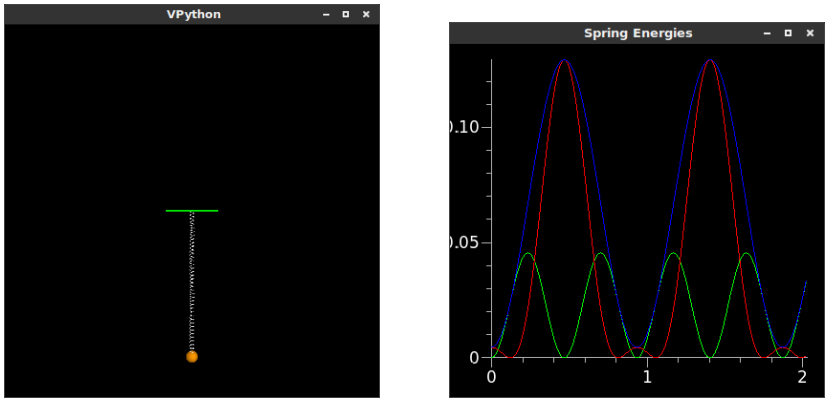
Question 44



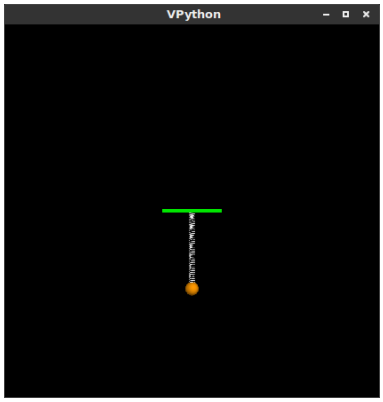
(a) Visual output for P44

(b) Graphical output for P44 *(Green, kinetic energy. Red, potential energy. Blue, sum of kinetic and potential energy)*

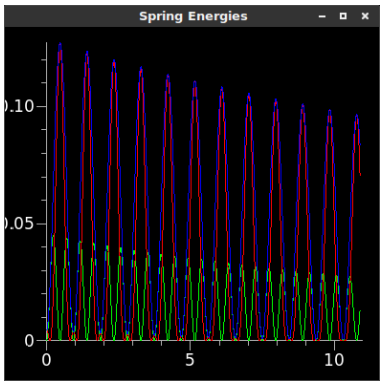
Figure 1: Outputs for Problem 44

For part a, the sum of the kinetic and potential energy is not constant over time. For part b, As the y-component of the position drops, the potential energy increases, while the kinetic energy decreases. As the kinetic energy increases the potential energy decreases at about the same amplitude, causing the sum to have little variation.

Question 45



(a) Visual output for P45

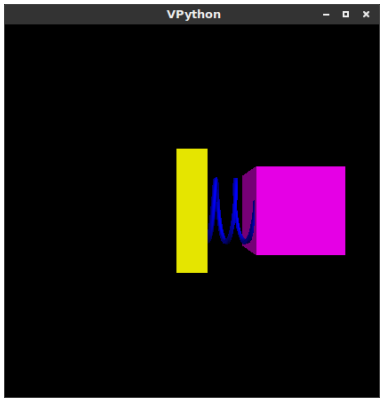


(b) Graphical output for P45 *(Green, kinetic energy. Red, potential energy. Blue, sum of kinetic and potential energy)*

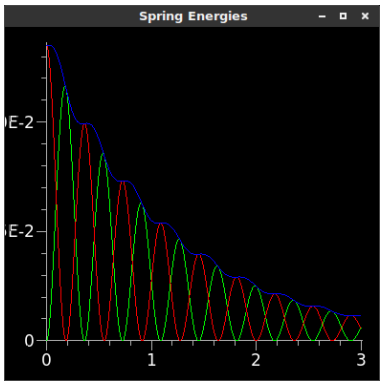
Figure 2: Outputs for Problem 45

The value of the coefficient used was 0.5. The rate of dissipation is not constant, there is a larger rate of dissipation towards the initial time. As time progresses there is less available energy

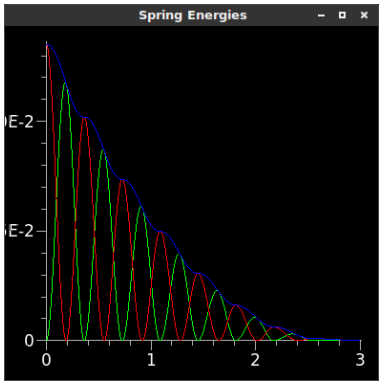
Question 46



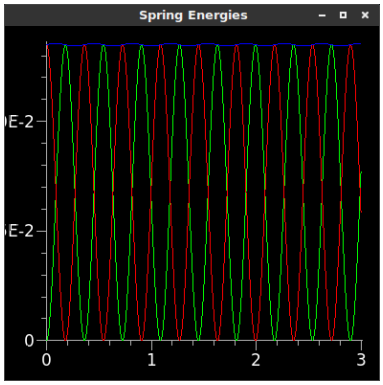
(a) Visual output for P46



(b) Graphical output for P46 with Viscous Drag *(Green, kinetic energy. Red, potential energy. Blue, sum of kinetic and potential energy)*



(c) Graphical output for P46 with Sliding Friction *(Green, kinetic energy. Red, potential energy. Blue, sum of kinetic and potential energy)*



(d) Graphical output for P46 with no opposing force. *(Green, kinetic energy. Red, potential energy. Blue, sum of kinetic and potential energy)*

Figure 3: Outputs for Problem 46

For part a, the period of oscillation for the model was determined to be approximately 0.75 seconds. The coefficient η that was used to calculate the viscous drag was 0.03. The amount of energy dissipation was constant until the total energy become closer to zero, then there was a graphical plateau that became more apparent. The plots in Figure 3 (b) and (c),the shape of the energy relationships is similar and based on the coefficients used show that the Sliding Friction dissipates at about the same rate. However, the energy associated with the Sliding Friction doesn't plateau in the same fashion.