Lab 1
Motion diagrams

Rectangle Repulsed Researchers
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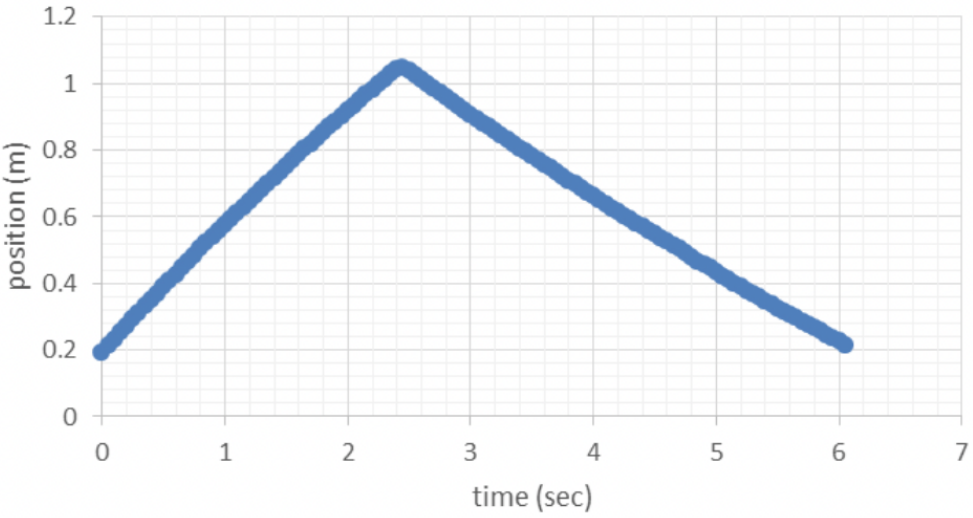
September 6, 2023

Part 3: Matching Position vs. Time and Velocity vs. Time Graphs

Graph 1



Graph analysis
Graph one describes a the position vs time graph of an object in a collision. The graph directly shows that the object's position from the sensor increases, then it's position relative to the sensor decreases starting at $t = \approx 2.4s$. The derivative of a position vs time graph discribes the velocity of the object. From the slope of the graph, one can conclude that the velocity for $t\epsilon[0, 2.4)$ is constant and positive. Then from $t\epsilon(2.4, 6]$ the velocity becomes negative.

Graph 1 shows a graph of a collision. The object's distance from the sensor is increasing. The slope of the position is velocity so

we can also say that the velocity is positive and constant. Then at $t \approx 2.4s$ its position begins decreasing at a constant, negative velocity.

$$\frac{d}{dx}[s(t)] = v_{x_1} = 0.35m/sV_{x_2} = -0.35m/s \tag{1}$$

Setup
Our setup consisted as a flat track with a magnetic bumper $60cm$ from the the *PASCO Universal 850 interface and Motion Sensor II*. We pushed and released the cart towards the bumper. We consider friction and drag negligible.

Graph 2:
Graph discription:
Graph 2 depicts an object speeding up at a constant rate. We know this because the object's position is increasing and the velocity is positive and increasing.
Setup:
Our setup consisted of a track at an downward incline. We released the cart from the top of the track and let it slide to the bottom. We consider friction and drag negligible.

Graph 3:
Graph discription:
Graph 3 depicts an object in freefall that hits the ground and stays there. We know this because the object's position starts from an increased height
Setup:
Our setup consisted of a the sensor positioned updward. We dropped a large beach ball.

Graph 4:
Graph discription:
Graph 4 depicts an object moving down an incline. It comes in contact with somethinhg at the bottom and changes direction. As it changes direction it slows down. Then at $t = 2.6s$ its velocity becomes negaiive but the acceleration staus positive where it is slowing down
Setup:
Our setup consisted of a the sensor positioned at the biotton of an incline plane. We released the cart from the top
Graph 5:
Graph discription:
Graph 5 depicts an object that starts from rest then is that ts pushed then slows to a stop. We know this because the graph depicts the initial velocity as 0m/s, then the velocity rapidluy increases and the acceleration is posiyive. It the acceleratyion goes to zero and he velocity is constant
Setup:
Our setup consisted a flat plane and w pushed the cart away from the sensor
Graph 6:
Graph discription:
Graph 6 depicts an object which is pushed and released up a hill. Eventually gravity slows it down and it returns down the hill
Setup:
Our setup consisted of a incline plane. We gave the cart a push and let it go up the hill then return down
Graph 6:

Graph discription:
Graph 6 depicts an object moving up and swown on a spring.
Setup:
Our setup consisted of an downward incline. The bumper was positioned $60cm$ away from the sensor.