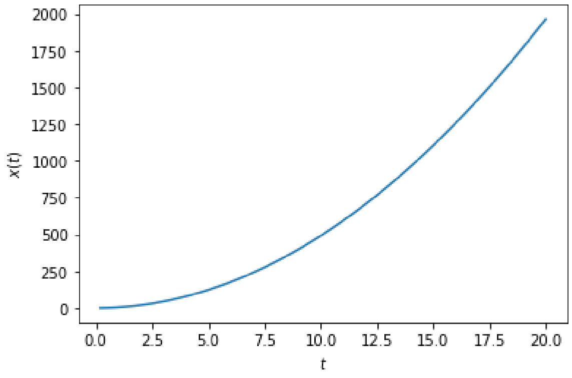
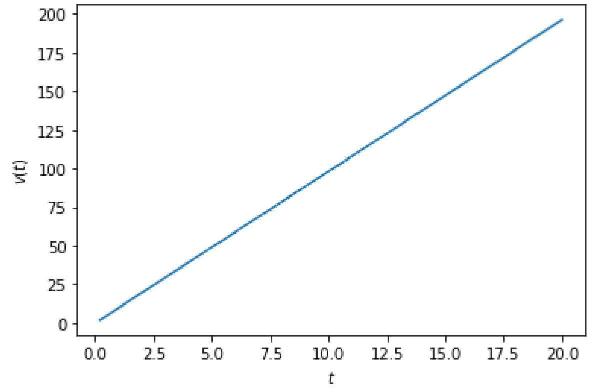
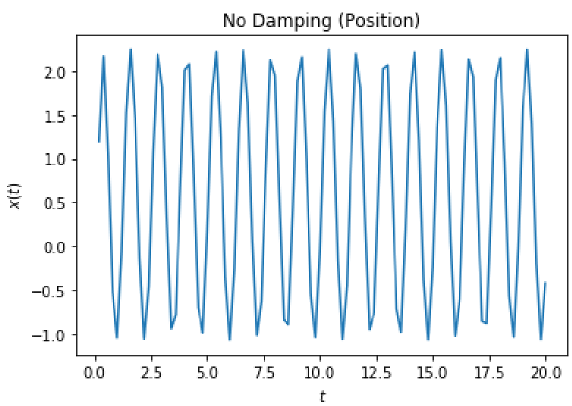
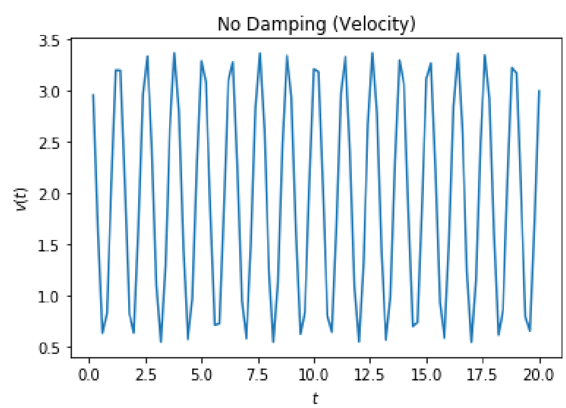


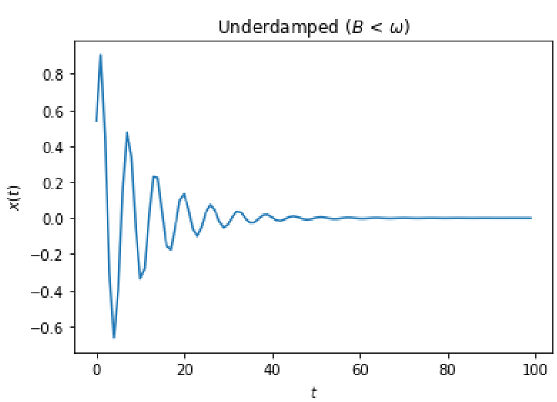


The plots above are my initial test plots to see if I was correctly implementing the verlet algorithm. On the left is a position vs time plot generated using this method. The right shows a plot of velocity vs time. These results seem correct and appear reasonable to me.

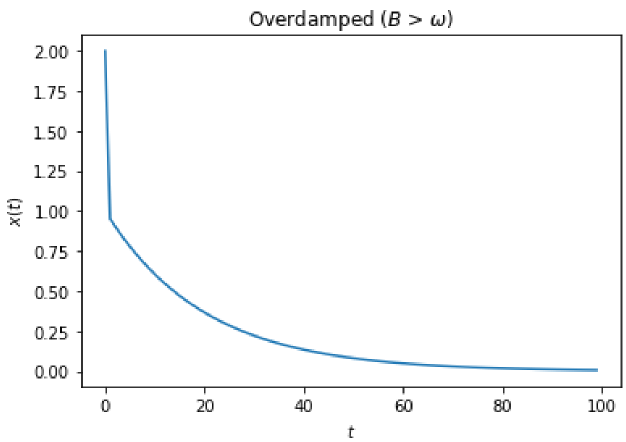




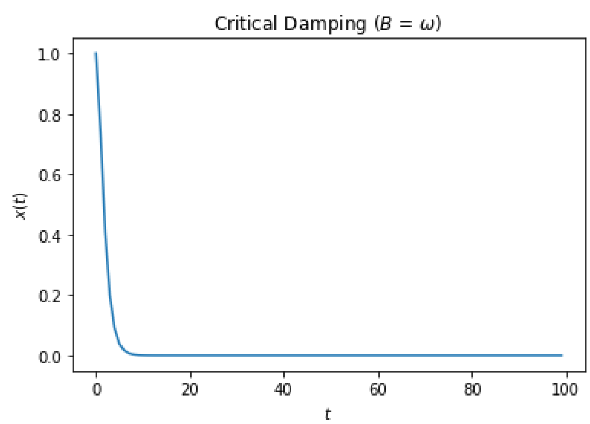
The plots above show my initial usage of the verlet algorithm with harmonic oscillators. There is no damping present, so we expect to see continuous oscillations.



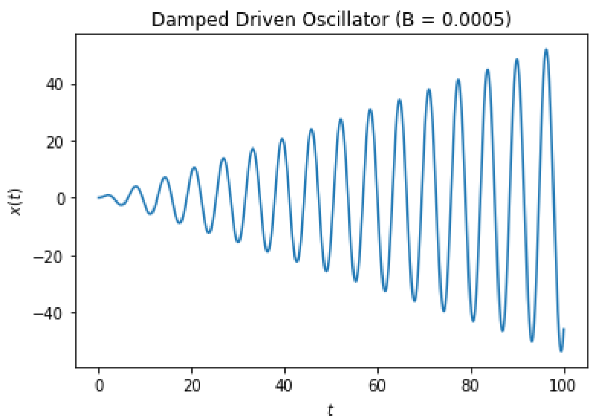
Next we have a plot of an underdamped oscillator. The value of β is less than the value of ω. We expect to see some initial oscillations that eventually go to 0 as time goes on.

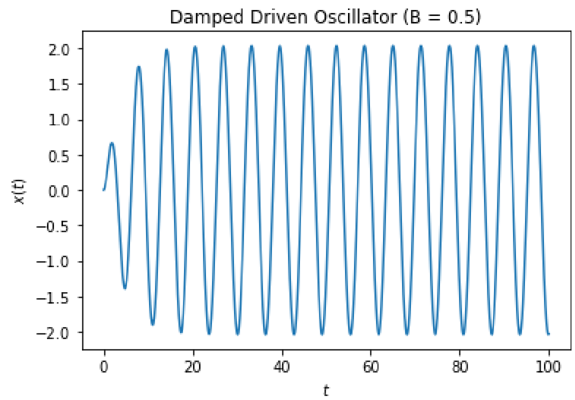


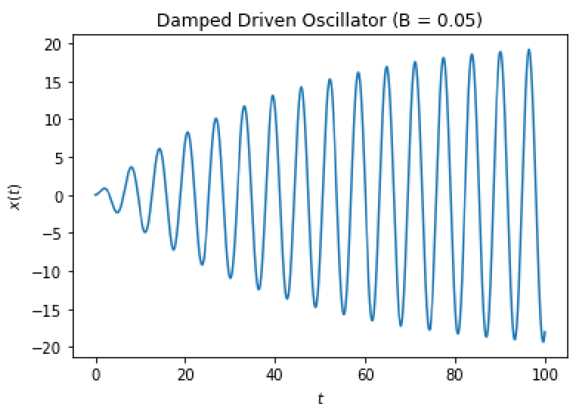
Here we have a plot of an overdamped oscillator. The value of β (the decay parameter) is greater than that of ω. The larger value of β compared to ω, the more time it will take for the oscillation to decay.



Above is a plot of a critically damped oscillator. The value of β is equal to the value of ω. We should expect to see the quickest approach to zero compared to the other damped oscillators.







Above are my plots of a damped driven oscillator with varying values of β. Initially, all plots look different but end up with the same phase and amplitude as time goes on. The time it takes for this to occur depends on the value of β. Plots with much lighter damping take longer to reach this point. The value of the driving frequency is 0.99 in all cases above. Changing the value of the driving frequency leads to some interesting results as seen below.