Phase space trajectory of a 1D harmonic oscillator

According to Hamilton's equation for H(x, P):

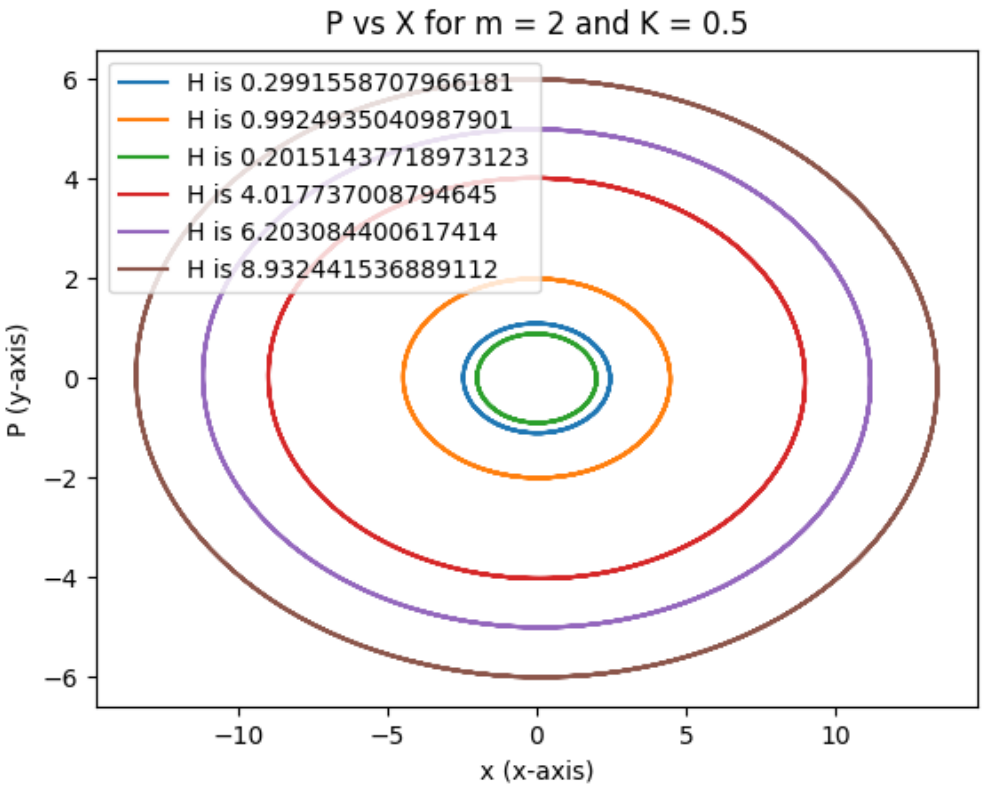
- dP/dt = - dH/dx
- dx/dt = dH/dp

Therefore for given, $H(x, P) = Kx^2/2 + P^2/2m$

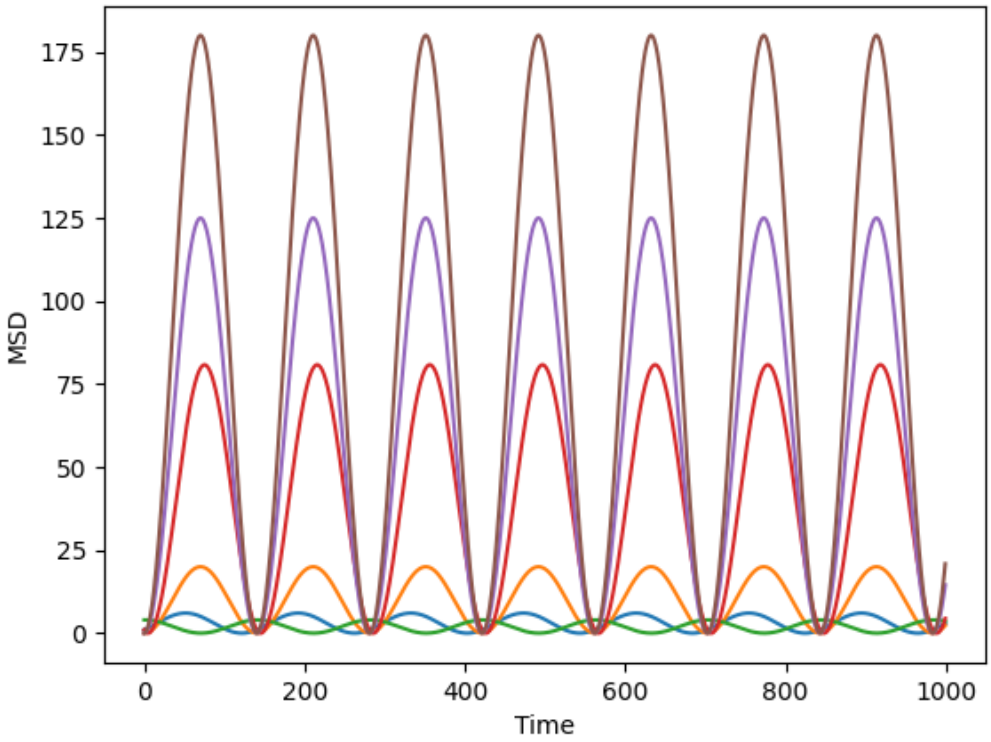
Time Evolution of P & x are:

- dP/dt = -Kx
- dx/dt = P/m

Phase space Graph (P vs x):



Mean Square Displacement Vs Time:


MSD
175
150
125
100
75
50
25
0
0
200
400
600
800
1000
Time