

# Notes 8/23

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## Simple Harmonic Oscillator

1. Mass on a spring (Hooke's law)
2. Pendulum's with small angle approximation
3. Quantum mechanics

$$SHO : \ddot{x} = -\omega_0^2 x$$

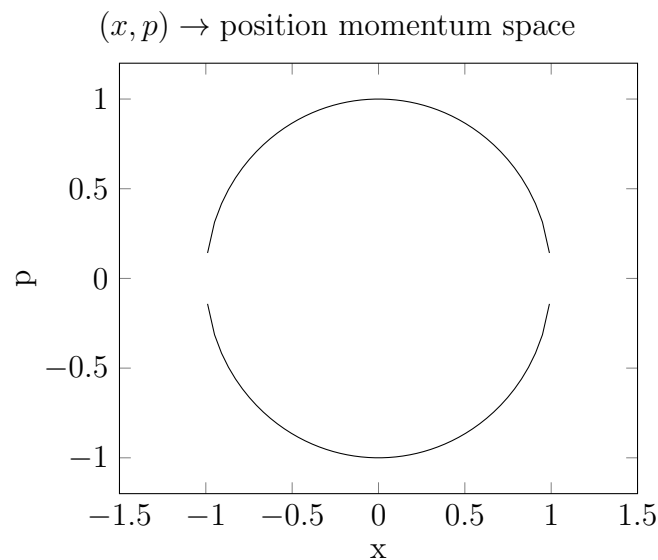
## Force has some associated potential

$$F = -\frac{\delta V}{\delta x} \rightarrow V(x) = \frac{1}{2}m\omega_0^2 x^2$$

## Solution

$$A_0 \cos(\omega_0 t - \delta)$$

## Phase Space



## Phase Portrait

A collection of trajectories   orbits in phase space, only really possible with orbits

## Damping

$$m\ddot{x} + b\dot{x} + kx = 0$$

Linear damping is called viscous damping.