

Harmonic Oscillator Classification

Math 230

Consider the harmonic oscillator modeled by the second-order differential equation

$$y'' + py' + y = 0.$$

1. For what value of p is the oscillator undamped? What is the general solution to the differential equation in this case?
2. For what values of p is the oscillator underdamped? What is the general solution?
3. For what value of p is the oscillator critically damped? What is the general solution?
4. For what values of p is the oscillator overdamped? What is the general solution?