

Mechanical Engineering Master's Defense

Phase Oscillator

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abstract

A control method based on the phase angle is used to control oscillating systems. The phase oscillator uses the sine and cosine of the phase angle to change key properties of a mass-spring-damper system, including amplitude, frequency, and equilibrium. An inverted pendulum is used to show a further application of the phase oscillator. Two methods of control based on the phase oscillator are used for swing-up and balancing of the pendulum. The first control method involves two separate stages. The scenarios where this control works are discussed. The second control method uses variable coefficients to result in a smooth transition between swing-up and balancing.



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