

CONTROLLING SPATIAL OSCILLATIONS OF A PENDULUM BY VARIATIONS IN ITS LENGTH

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- *ABSTRACT: A method for reducing a pendulum's spatial oscillations by variations in its length is found. This strategy is obtained by casting the problem as an optimal control problem. The pendulum's governing equations are deduced and using these equations the oscillation energy of the pendulum is found. The problem becomes a variational problem with constraints in which a functional which represents the oscillation energy of the pendulum is to be minimized. Using Pontryagin's Principle, efficient solutions are found. Finally, the effectiveness of the found strategies is illustrated graphically; analytical and numerical comparisons are made. Unlike the planar oscillation case, the energy cannot be made arbitrarily small.*
- *KEYWORDS: Pendulum of variable length; oscillation energy; Pontryagin's principle.*

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