

The energy-optimal motion of a vibration-driven robot in a medium with a inherited law of resistance

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Abstract

© 2015, Pleiades Publishing, Ltd. The rectilinear motion of a two-mass system consisting of a spherical body and a movable internal mass in a liquid is considered. In addition to quadratic in velocity viscous forces, resistance forces also include those dependent on the history of the motion of Basset forces and inertial forces of added mass. The task is to find the periodic law of motion of the internal mass that minimizes the work of the resistance forces during the period of motion of the system for a fixed period of oscillations and the given average velocity of the shell. The dependence of the optimal modes of the dimensionless oscillation period that characterizes the ratio of Basset forces to viscous forces is investigated.

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