15th INTERNATIONAL CONFERENCE
Dynamical Systems — Theory and Applications
December 2-5, 2019. Lodz, POLAND.

DSTA 2019

paper id: CON182

Dynamics of a spherical robot in cases of periodical control actions and oscillations of the underlying surface

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Abstract: The dynamics of a spherical robot of combined type is investigated. The spherical robot is set in motion by moving the position of the center of mass and by generating variable gyrostatic momentum. Problems of stabilizing the rolling of the spherical robot using periodic control actions are considered within the framework of a nonholonomic model. A mathematical model is presented which describes the movement of the spherical robot on an oscillating flat surface. The results of numerical modeling of the motion of the spherical robot for various combinations of control actions and parameters of plane oscillations are discussed.

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