The problem of drift and recurrence for the rolling Chaplygin ball. (English summary)


The Chaplygin ball is a round sphere, rolling without slipping on a horizontal plane, with center of mass at the center of the sphere, but with arbitrary moments of inertia. An integrable non-holonomic system was first considered by S. A. Chaplygin in 1903 [see Regul. Chaotic Dyn. 7 (2002), no. 2, 131–148; MR1912979]. Here the authors address the problem of the motion of the contact point in a rigorous way analyzing the drift and transverse oscillations in the motion of the Chaplygin ball using both analytical methods and methods of topological analysis of integrable systems. This is a complex problem that may be useful for the study of the absolute dynamics of integrable non-Hamiltonian dynamical systems and is of great interest in the study of non-holonomic robots.

References

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.