

Integrability and non-integrability in terms of transcendental functions

Maxim V. Shamolin, Lomonosov Moscow State University.

ABSTRACT

The present activity is devoted to development of qualitative methods in dynamics of a rigid body interacting with a resisting medium under the assumptions of quasi-stationarity. The given material is on the junction of the qualitative theory of the ordinary differential equations, dynamics a rigid body. In this investigation the properties of movement of a rigid body in medium under the assumptions of jet flow are used. The technique of a research of the flat and spartial model problem of a body motion in a resisting medium is constructed. The new sets of phase portraits of systems with a variable dissipation on two-dimensional and three-dimensional manifolds are obtained, their absolute or relative roughness is shown. Cases of motions of a rigid body, including in a classical problem about motion of a spherical pendulum located in a stream of a filling medium are detected integrable till the Jacobi.

Keywords: *integrability, non-integrability, analitical and transcendental functions*

Mathematics Subject Classification: *58F40*

Contact Address: *shamolin@inmech.msu.su*