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Mathematical model of magnetically interacting rigid bodies

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Dynamics of two bodies, which interacts by magnetic forces, is considered. Model of interaction builds on quasi-stationary approach for electromagnetic field, and symmetric rotors with different moments of inertia of the bodies are considered. Interaction energy general form is discovered for the case of coincidence of mass and magnetic symmetries. Since the energy of interaction depends only from relative position of the bodies, then the consideration is too much simplified in c.m. system, notwithstanding that force is noncentral. The task requires development of the classic Hamilton formalism for the systems of magnetically interactive bodies, including the systems of the magnets and/or superconductive magnets (mixed systems). Hamilton motion equations are obtained on the basis of Poisson structure in the dynamic variables area. Such approach allows represent the equations in galilei-invariant vector form in contrast to default definition in Euler's angles. Invariance laws follow from system symmetry is considered. This variant of Hamilton formalism easily spreads in the case of arbitrary number of magnetically interactive symmetric symmetric rotors. All equations with Poisson brackets are tested with symbolic features of Maple system. For the numeral modelling of magnetic rigid bodies dynamics Maple and MATLAB packages are used. The obtained mathematical model allows investigate the possibility of orbital motion in the system of magnetically interactive bodies.

Summary

Dynamics of two bodies, which interacts by magnetic forces, is considered. The task requires development of the classic Hamilton formalism for the systems of magnetically interactive bodies, including the systems of the magnets and/or superconductive magnets (mixed systems). All equations with Poisson brackets are tested with symbolic features of Maple system. For the numeral modelling of magnetic rigid bodies dynamics Maple and MATLAB packages are used.

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