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On the spacecraft altitude stabilization in the orbital frame. (English) Zbl 1299.70048
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Summary: The paper deals with a spacecraft in a circular near-Earth orbit. The spacecraft interacts with the geomagnetic field by the moments of the Lorentz and magnetic forces. The octupole approximation of the Earth's magnetic field is adopted. The spacecraft electromagnetic parameters, namely the electrostatic charge moment of the first order and the eigenmagnetic moment are the controlled quasiperiodic functions. The control algorithms for the spacecraft electromagnetic parameters, which allow to stabilize the spacecraft altitude position in the orbital frame are obtained. The stability of the spacecraft orientation is proved both analytically and by numerical computations.

MSC:

- 70M20 Orbital mechanics
- 70Q05 Control of mechanical systems
- 93D15 Stabilization of systems by feedback
- 70K20 Stability for nonlinear problems in mechanics

Keywords:

spacecraft; altitude stabilization; geomagnetic field

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