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ANALYSIS OF THE EFFECTS OF DISTURBING FACTORS ON THE DYNAMICS OF A
SPACECRAFT IN LOW-EARTH ORBIT

**Abstract**

Today, spacecraft in low-Earth orbits are widely used for remote sensing of the Earth. They are used to perform a large number of tasks, such as monitoring forests during fire-hazardous periods and searching for deposits of rare-earth metals. To carry out such observations, high requirements are imposed on the constancy of the satellite's orbit altitude. In this regard, the question of studying the effects of disturbing factors on the dynamics of the spacecraft and the analysis of the consequences of this impact is relevant. The main goal of the research is the creation of a universal program capable of predicting the effect of disturbing factors on spacecraft with an arbitrary mass, dimensions and orbit characteristics (at altitudes up to 400 km). The paper examined the atmospheric parameters as functions of latitude, longitude, time and altitude. The method of determining the coefficients for predicting atmospheric density (and other parameters) is described and their values for 2023 are given. The expediency of application of the empirical model of the atmosphere Mass Spectrometer Incoherent Scatter (MSIS) to describe the changes of the vector of aerodynamic drag forces during the motion of the spacecraft on an arbitrary orbit is shown. The influence of the unevenness of the Earth's gravitational field on the orbit stability of the spacecraft is studied. The result of the calculation of the program is the cyclogram of the electric propulsion, required to maintain a constant altitude of the spacecraft. Additionally, the program has a module for preliminary design calculation of the characteristics of the spacecraft nodes in accordance with the tasks of the future mission.