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Task of Autonomous Orientation of Orbital Spacecraft

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Abstract. During the operation of a spacecraft (SC) angular motion control system, there is a need to switch off external information sensors. The examples are astroorientation, gyrocompassing, and inertial systems, in which, depending on the type of the sensors used or the logic of construction, correction by external information can be intentionally interrupted (for instance, to “bypass” the Sun’s illumination of the optical sensors’ fields of view). The SC angular orientation changes at once. All that the orientation system has at the moment of transfer to such an autonomous mode is information about the previous parameters of angular correction and data on the motion of the SC mass center. Nevertheless, this information is sufficient to create a special correction mode extrapolating the angular correction parameters to the autonomous operation mode of the attitude control system and preserving the quality of SC orientation. Much attention is paid to the explanation of the physical nature and character of the SC orientation change. The paper addresses a practical example of creating a special autonomous orientation mode and shows the results of its operation modelling.

Keywords: system, orientation, astroorientation, correction, autonomous mode, extrapolation, spacecraft

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