Lunar Exploration (3)
Lunar Analysis & Simulation (4)

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# METHOD OF DETERMINING THE PARAMETERS OF LONGITUDINAL MOVEMENT OF THE SPACECRAFT LANDING ON THE SURFACE OF A SMALL CELESTIAL BODY

**Abstract**

During the schematic design of spacecraft (SC) for landing on the surface of a small celestial body, a method of determining the parameters of the movement is required, evaluation of power load on the landing struts is allow to identify the main characteristics of landing struts, choose the parameters of the cushion, assess the conditions of safe landing on the surface of a small celestial body. In this paper a method is developed for determining the motion parameters of a SC during its landing on the surface of small planets, taking account of the influence of reaction from the soil surface on the SC and the effect of engines. For example, landing on the surface of the moon, the application of the method for studying the dynamics of the motion of the SC is considered. In the case of landing selected the best optimal value of the force of the shock absorbers. The impact of initial angular position of SC with the moon on the change of position of the struts is evaluated, and the impact of the values of normal forces on the struts from soil reaction, and the deformation of shock absorbers during the landing. Graphics of longitudinal and vertical velocity of SC taking into account the influence of struts' non-simultaneous touching with the soil are presented. Results show that when landing on the lunar surface the most dangerous case is the longitudinal movement of the second component of the velocity on the rising slope of the surface. Therefore, in the early stage of design it is possible to use the calculation parameters of the longitudinal movement of a landing, and this allows estimating the load on landing struts.