A.P. ALPATOV, S.V. KHOROSHYLOV, A.I. MASLOVA

CONTACTLESS DE-ORBITING OF SPACE DEBRIS BY THE ION BEAM

DYNAMICS AND CONTROL

NATIONAL ACADEMY OF SCIENCES OF UKRAINE
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INSTITUTE OF TECHNICAL MECHANICS

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The book is devoted to a promising technology for contactless removal of space debris, dubbed “ion beam shepherd”. Dynamic models to simulate and study the motion of the “shepherd” and the space debris object during its contactless de-orbiting are presented. Simplified analytical models have been developed to calculate the ion beam impact. Algorithms and results of numerical calculations of the forces and torques transmitted by the ion beam to the upper stages of the “Cyclone-3” and “Cyclone-4” launch vehicles are given. The evolution of the space debris orbit was analyzed taking into account the necessity to switch-off the ion thrusters in the shaded areas of the orbit. The book may be of interest for research and engineering staff working in the field of rocket and space technology, as well as for undergraduate and graduate students studying in the relevant areas.

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