
Safety policy for the four-impulse rendezvous maneuver on the near-circular orbits

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The article touches upon the problem of safety measures for the orbital rendezvous maneuver with regard to the spacecraft deviation from the dangerous approach to the lumps of space debris. The distinctive feature is an inability to perform an additional deviation maneuver at the phasing stage. We suggest a technique for changing the four-impulse rendezvous maneuver on the near-circular orbits, which allows avoiding the collision on the phasing orbit without extra power consumption. The technique is based on the geometrical representation of the maneuver in the plane of the eccentricity vector projection and involves changing the maneuver performance with account of the forbidden region. We present an algorithm for searching this region. The article analyses the dependence of the forbidden region shape, dimensions and location on the dangerous approach magnitude.

Keywords: *spacecraft, space debris, space objects catalogue, dangerous approach, deviation from the dangerous approach, rendezvous maneuver, phasing orbit, four-impulse maneuver, maneuvering plan*

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