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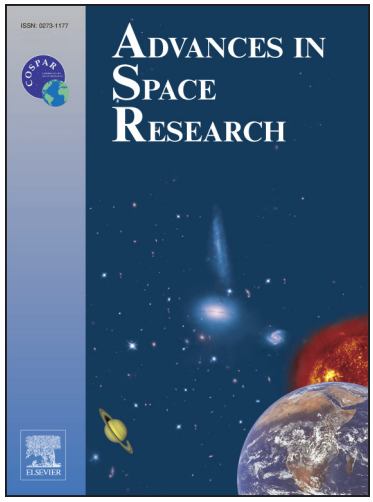

An Orbit Determination from Debris Impacts on Measurement Satellites

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An Orbit Determination from Debris Impacts on Measurement Satellites

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Abstract

This work proposes a method to determine orbital plane of a micron-sized space debris cloud utilizing their impacts on measurement satellites. Given that debris impacts occur on a line of intersection between debris and satellites orbital planes, a couple of debris orbital parameters, right ascension of the ascending node, inclination, and nodal regression rate can be determined by impact times and locations measured from more than two satellites in different earth orbits. This paper proves that unique solution for the debris orbital parameters is obtained from the measurement data, and derives a computational scheme to estimate them. The effectiveness of the proposed scheme is finally demonstrated by a simulation test, in which measurement

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