

SPACE DEBRIS SYMPOSIUM (A6)
Poster Session (P)

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COMPARISON OF CENTERING ALGORITHM FOR OPTICAL SPACE DEBRIS CCD IMAGES

Abstract

Measuring the centroid position of object images with high order precision is always one of the most important objectives for optical space debris observations. The accuracy and reliability of the centering algorithm play an important role for optical space debris monitoring. The scope of this paper is to compare the performances of variable classic centering algorithms, which have been widely used in astronomical data reduction, including modified moment, one-dimensional and two-dimensional profile fit, etc. Therefore, this paper can provide a guide for the selection of the most suitable centering algorithm in multiple conditions. A trial observation is carried out to obtain the CCD frames, and during observation, both low-earth orbital and high-earth orbital satellites with accurate ephemeris are observed. The object center is extracted by variable means and the accuracy of multiple algorithms is obtained by the compare between ephemeris and astronomical calibration results. Finally, based on the experimental results, the specific feature of variable algorithms is analyzed, and the optimal selection as well as the accuracy comparison among different approaches is further discussed.