

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
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RESEARCHES ON THE MEASUREMENT OF RELATIVE POSES BETWEEN TWO  
NON-COOPERATIVE SPACECRAFTS IN CLOSE RANGE BASED ON REMARKABLE FEATURE  
POINTS

**Abstract**

With the development of space technology, proximity operations have become more and more important in many space-related applications, such as on-orbit servicing, debris removal, etc. The tendency is to develop autonomous spacecraft against non-cooperative targets, which can maneuver to the target spacecraft autonomously as close as possible, so as to complete on-orbit servicing and debris removal missions. In order to solve the problem of relative navigation with non-cooperative spacecraft in close range, a kind of scheme for the measurement of relative poses between two non-cooperative spacecrafts in close range based on remarkable feature points is proposed. Firstly, the remarkable feature points are extracted in subpixel precision based on Harris operator. Secondly, the feature points are matched in subpixel precision based on polar constraint. Then, the coordinate system of target spacecraft is established after the 3D coordinates of all the matching feature points are solved. Finally, the measurement problem of relative poses between non-cooperative spacecrafts is changed into the problem of relative poses measurement between cooperative spacecrafts. The corresponding simulating results are given, and the expectation of possible applications is also given.