

SPACE DEBRIS SYMPOSIUM (A6)  
Measurements (1)

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APPLICATION OF MORPHOLOGICAL MATHEMATIC IN OPTICAL SPACE DEBRIS  
OBSERVATION**Abstract**

Mathematical morphology is a method based on the set theory and using geometrical structures for image analysis. The transformation is done according to the characterizations of interest. With the operators of morphological mathematic, object images of special geometrical structure can be kept or eliminated from the image. Two applications in optical space debris observation are presented. In the former one, the transformation is used for processing the smeared image of camera without shutter, tests carried out indicate that smear noise can be removed effectively, and the detection rate as well as the position accuracy of both stars and objects is promoted distinctly, the efficiency of the method is proved. In the latter application, the operator of morphology mathematic is used to separate the blended images. Concerning the difference of geometry between stars and objects in space debris observation, the blended images are separated efficiently with the special structural element fitting the geometric shape of stars as we defined. Tests carried out on the simulated overlapping images indicate that the residual systematic defects of the algorithm are less than 0.3 pixels, while the famous SExtractor software can not do the same separation. The technique can solve the problem of blending with high precision.