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A star identification algorithm based on a voting scheme for star trackers

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Abstract

Star identification is one of the most important stages in attitude determination with star trackers. This can be performed using matching algorithms between observed stars and a master star catalogue. The main challenge in this approach is to provide a fast and reliable identification algorithm that is sufficiently robust in different pointing views of the star tracker optical system in the space. In this article, an identification algorithm based on a geometric voting scheme is presented. In this algorithm a pair of stars in the catalogue votes for a pair of stars in the image if angular distance between the stars of both pairs is similar. As angular distance is a symmetric relationship, each of the two catalogue stars votes for each of the image stars. The identity of each star in the image is set to the identity of the catalogue star which cast the most votes. Applying the algorithm in different attitudes and with different optical system parameters shows its high performance in star identification in our simulations.

Keywords: star identification, search mode, attitude determination, star tracker, star catalogue, geometric voting

For full article, refer to the Persian section