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A NOVEL OPTIMIZATION METHOD FOR STAR-SENSOR DATA PROCESSING

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Abstract

A novel optimization method for star sensor data processing has been proposed in this paper by which the stability and accuracy of star sensor attitude outputs have been improved. Aiming at the problem that the star sensor has unacceptable single measurement error, which reduces the accuracy of navigation and dissatisfies the requirement of high accuracy in navigation system. Utilizing improved transformation, extraction, interpolation and filtering, then using wavelet analysis integrated with Allan variance, the star-sensor measurement data is processed to solve the problems mentioned above. By adopting this method, the star-sensor can achieve: 1) Eliminate outliers accurately, to enhance the ability of error redundancy; 2) Smooth and eliminate the low frequency trend, to enhance the ability of interference resistance; 3) Uniform data with equal interval and continuous, to enhance the stability; 4) Restrain the internal noise and observation noise, to enhance the signal to noise ratio; 5) De-noised with improved method, to promote star-sensor attitude output accuracy.

Keywords: star-sensor; de-noise; allan variance; wavelet analysis; high accuracy.

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