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A novel algorithm for marine strapdown gyrocompass based on digital filter

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Abstract

With the rapid development of strapdown gyrocompass, few corresponding strapdown algorithms occur in publications, so that we have to use the conventional one designed for platform gyrocompass. Enlightened by IXSEA ideals, we proposed a novel algorithm which is suitable for marine strapdown gyrocompass. In our proposed algorithm, gyro outputs are used to track the body frame rotation, and the observation of the pure gravity slow drift in the inertial gives the navigation frame rotation. We also separate the pure gravity from interferential accelerations with a FIR low-pass digital filter. The analysis and numerical results show the better performance of the proposed algorithm than the conventional one.

Highlights

• The first study to apply strapdown technology in gyrocompass to measure the

attitude of vessel in detail. A novel measurement method of utilizing gravity slow drift to determine the true geographical north is proposed. The error analysis of the novel method is conducted and compared with conventional one.



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Keywords

Marine; Strapdown; Gyrocompass; Digital filter; Gravity

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