DOI: 10.37102/1992-4429_2025_52_02_07

A FINE ALIGNMENT OF A STRAPDOWN INERTIAL NAVIGATION SYSTEM, WITCH IS PART OF THE NAVIGATION COMPLEX OF AN AUTONOMOUS UNDERWATER VEHICLE AND IN PITCHING CONDITIONS

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The problem of initial alignment for a strapdown inertial navigation system (INS), which is part of the navigation complex for an autonomous underwater vehicle (AUV), is being considered. INS also uses the following sensors for its aided navigation: a hydroacoustic sensor that measures the distance to a floating beacon with known coordinates, as well as a lag and depth sensor. The goal of the INS alignment problem is to accurately determine (estimate) the values of attitude angles such as heading, roll and trim using readings from inertial sensors: accelerometers, angular velocity sensors (ARC) or gyroscopes. A special features of the problem under consideration is the presence of pitching conditions caused by sea waves. It is assumed that the linear motions of the INS are insignificant.To solve the problem of the alignment in pitching conditions, the INS positional aiding algorithm is used in feedback mode. This algorithm is based on the Kalman filtering.

Keywords: strapdown inertial navigation system (INS), INS alignment, INS alignment on a moving base, INS alignment in pitching conditions, INS error equations, the Kalman filter.

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Recommended citation:

Vavilova N.B., Golovan A.A., Kozlov A.V., Papusha I.A. A FINE ALIGNMENT OF A STRAPDOWN INERTIAL NAVIGATION SYSTEM, WITCH IS PART OF THE NAVIGATION COMPLEX OF AN AUTONOMOUS UNDERWATER VEHICLE AND IN PITCHING CONDITIONS. UNDERWATER INVESTIGATIONS AND ROBOTICS. 2025. No. 2 (52). P. 72–80. DOI: 10.37102/1992-4429_2025_51_01_07. EDN: XFQBQR.

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