

ANALYSIS OF THE STRAPDOWN INERTIAL NAVIGATION SYSTEM STRUCTURE

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The Strapdown Inertial Navigation System (SINS) is one of the main navigation components. The main objective of SINS is to determine the location of the aircraft, its velocity, yaw, and other parameters. However, the error of the SINS increases with the time duration of its operation. The error of the SINS depends on the system structure and the accuracy of primary data sensors such as accelerometers and angular velocity sensors. The inaccuracy of the primary data sensors passes through all the system, where it converts into positioning error. The structure of the SINS is complex. It includes the accelerometers and angular velocity sensors functional correction loops. This leads to the appearance of positive and negative feedback loops in the SINS structure, as well as cross-communication circuits between channels. Performed simulations of each separate feedback loop is followed by applying error in the primary data sensors. Simulation results have shown that the feedback loops generated by the angular velocity sensors led to large system errors.

References

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