



INITIAL ALIGNMENT OF FIBER-OPTIC INERTIAL NAVIGATION SYSTEM WITH LARGE MISALIGNMENT ANGLES BASED ON GENERALIZED PROPORTIONAL- INTEGRAL-DERIVATIVE FILTER

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Abstract- Initial alignment in the presence of large misalignment angles is a critical issue in strapdown inertial navigation systems. The large initial misalignment angle adversely affects the accuracy and rapidness of the alignment process. In this paper a novel robust alignment approach is proposed based on a generalized proportional-integral-derivative filter. The proposed alignment approach has some significant advantages compared to the standard Kalman filter based alignment method. This method increases the accuracy and the convergence speed of the alignment process in the large misalignment angles problem. Experimental results also, verify the prominent performance of the presented approach in comparison to conventional standard Kalman filter based alignment method.

Index terms: Standard Kalman Filter, Generalized Proportional-Integral-Derivative Filter, Strapdown Inertial Navigation System, Initial Alignment , Large Misalignment Angles.