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H.V. Suvorov, graduate student
National Aviation University, Ukraine

MATHEMATICAL MODEL OF THE POINTING ALGORITHM OF STRAP-DOWN INERTIAL SYSTEM, TAKING INTO ACCOUNT REDUCING ERROR MEASUREMENT BY THE METHOD OF OPTIMUM FILTERING

The main purpose of navigation and orientation computer information complex is a co-operative data processing of navigationmeasurements in order to determinethemainparametersof a mobile objectasaccuratelyaspossible. This accuracy depends not only on quality of navigation computations, but also on the processing algorithms of results as well. This paper presents one of the potentially possible algorithms of complex information processing in the navigation – method of optimum Kalman filter, which allows obtaining estimations of measured parameters with high precision. The main goal of optimum processing of navigation information is to achieve optimum estimations of the state vector of the aircraft during measuring and under the conditions of random disturbances and noise. The model of dynamical system has been created using a mathematical apparatus. Output signals are represented by noisy measurements of roll and pitch displacement. The main goal during computing involves the achievement of estimation errors of navigation parameters, which are measured via aircraft navigation system (pointing algorithm) using a recursive optimum filter. The results, which had been obtained, showed, afterwards, a successful realization of Kalman filtering as one of the navigation processing methods.

The parameters of estimation turned out to be relatively equal to the ideal (noise free) operation mode of the pointing algorithm.

The transient response of the parameter estimation, that are the signals of roll and pitch angles, has a decay characteristic. In spite of the development of electronics and computing technique the implementation of optimum Kalman filtering on board of any aircraft is quite sophisticated. It is related to the fact that, it is necessary to operate with a quite big statevector, which will be subjected to estimation, in order to obtain the accurate informationabout parameters. Due to such big statevector the speed of modern on-board computers is not enough for processing. That's why the information uptake in real-time will not come true.

Nevertheless, such method can be positive in the flight data processing of flight essential avionics during flight tests where time limitation not so important as the accuracy of estimation of the measurement parameters.

Supervisor – PhD. of Tech. Sci., Assoc. Prof. V.O. Rogozhyn,