

## ABSTRACT

The thesis is presented in 79 pages. It contains 2 appendixes and a list of references to used sources of 30 titles. There are 20 figures and 3 tables in the thesis.

The goal of this thesis is to construct and implement a model for accurately determination for the parameters of the mutual motion of two spacecraft.

In this thesis are discussed and analyzed the existing solutions for the task of determining the parameters of the spacecraft movement, namely TrakStar 2, the Orbitron tracking system, and the thesis about the determination of the spacecraft's motion during an interplanetary flight. The methods for estimating the state vector for dynamic system parameters – Wiener filter, Kalman filter, extended Kalman filter, particle filter, guaranteed estimation method, and minimax filter – are discussed and analyzed. Their comparison is given from the point of view for assumptions about the nature of the uncertain quantities and the necessary a priori information for using a certain method. A method of guaranteed evaluation using ellipsoids is chosen for solving the task.

A mathematical model for solving a given problem with the use of the chosen method is constructed. The program realization of the built model is made. Testing the developed software product was performed.

Keywords: space vehicle, equation of dynamics of rotational motion, quaternions of rotation, estimation of the state and parameters of a dynamic system, a priori information, ellipsoidal filter, linearization of the equation.