

# Fundamentals of the Estimation Theory with Applications to the Problems of Navigation Information Processing. Part 1. Introduction to the Estimation Theory

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The book contains the description of general principles and approaches used to develop estimation algorithms for both linear and nonlinear problems. Much attention is given to the possibility to develop the most widespread stochastic estimators within the framework of the deterministic approach which does not involve the ideas of the probability theory. The interrelation of estimators obtained within the considered approaches with various a priori data is analyzed. The methods and algorithms developed for the constant vector are generalized as applied to the estimation of random sequences, Kalman-type algorithms being the most important of them.

The subject matter is explained using the methodic examples and problems, as well as those associated with navigation data processing. They include: estimation of polynomial coefficients, positioning by reference beacons and satellite data, update of navigation system data using external aids and integrated processing of redundant measurements.

Relevant insights into the probability theory and theory of matrix calculations are given, along with the description of applied MATLAB software.