

# Nonlinear filtering and its application in navigation (in Russian)

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The fundamentals and peculiarities of the nonlinear filtering methods applied to Markovian sequences and processes in navigational information processing are considered.

The approaches used in the solution of various nonlinear problems are studied. A significant attention is given to those in which the application of algorithms based on linearization (Kalman type algorithms) are unacceptable. The methods are analyzed in the context of a choice of such a posteriori density approximation, which generates algorithms convenient for realization.

The methods of potential accuracy calculation in nonlinear filtering problems are investigated. In particular, the evaluation algorithms for Cramer-Rao boundaries (CRB) are considered. The interrelation of the CRB and covariance matrices in linear and linearized problems is discussed.

The following problems are considered as examples:

- a problem of navigation system correction with the use of various external information, in particular, a map (map-matching) navigation problem;
- a problem of inertial navigation system alignment for the case of a large heading uncertainty;
- problems of radio engineering information processing;
- problems of matching random processes and sequences, the necessity of which arises, for example, when passive tracking systems are being developed.

The comparative analysis of the approaches and algorithms used in the solutions of various problems of navigational information processing are performed.

The book is intended for designers of algorithms of navigational information processing and also for researchers, post-graduate students and students engaged in development of various information processing systems.

References: 407. Fig.14. Tab. 6.

## CONTENTS

### Introduction

### Chapter 1. Fundamentals of the Nonlinear Filtering Theory

#### Introduction

1. Random values. Main characteristics. Transformation rules
2. Estimation problem. Bayesian approach
3. Estimation problem. Non-Bayesian Estimation. Least Squares

4. Comparison of Bayesian and Non-Bayesian Estimations
5. Fundamentals of the Random Processes Theory
6. Markovian Sequences. Discretization of Markovian Processes
7. Filtering of Markovian Sequences. Recurrent Equation..
8. Filtering of Markovian Processes. Stratonovich Equation

## **Chapter 2. Processing of Navigational Data and Its Peculiarities**

### Introduction

1. Navigation problems. Classification and Solution Methods
2. Typical Markovian Processes for Description of Navigational Errors
3. Distribution of Navigational Measurements. Statements of Filtering Problems
4. Peculiarities of Nonlinear Filtering Problems in Navigation
5. Peculiarities of Nonlinear Filtering Problems for Radioengineering
6. Data Integration with Complementary Filtering
7. Data Integration with Non-Complementary Filtering

## **Chapter 3. Nonlinear Filtering of Markovian Sequences**

### Introduction

1. Linear Filtering. Discrete Kalman Filter
2. Gaussian Approximation. Kalman-type Filters
3. Delta-Functions Approximation. Point Mass Method.
4. Gaussian Sums Approximation.
5. Partitioning Method
6. Piecewise-Gaussian Approximation
7. Filtering and Detection

## **Chapter 4. Filtering Accuracy of Markovian Sequences**

### Introduction

1. Monte-Carlo Method and Potential Filtering Accuracy
2. Monte-Carlo Method and Optimal Estimation
3. Cramer-Rao Inequality and Potential Filtering Accuracy
4. Cramer-Rao Bounds for Markovian Sequences
5. Cramer-Rao Bounds and Linearized Covariance Matrix

## **Chapter 5. Nonlinear Filtering of Markovian Processes**

### Introduction

1. Continuous Time Estimation. Likelihood Functional.

2. Gaussian Approximation. Kalman-type Filters..
3. Partitioning Method.
4. Gaussian Sums Approximation
5. Recurrent and Batches Algorithms..
6. Method of Additional and Intermediate Variables
7. Cramer-Rao Inequality for Continuous Time

## **Chapter 6. Correction Problems of Navigation System and Nonlinear Filtering**

### Introduction

1. Correction of Navigation System. Statement of the Problem
2. Cramer-Rao Bounds and Correction Problems
3. Potential Accuracy and Correction Problems
4. Nonlinear Filters for Correction Problems.  
Pseudo-stochastic Errors of Navigation Systems
5. Nonlinear Filters for Correction Problems.  
Markovian Errors of Navigation Systems

## **Chapter 7. Nonlinear Filtering for Alignment of Inertial Navigation Systems**

### Introduction

1. INS Alignment. Statement of the Problem
2. Cramer-Rao Bounds for INS Alignment
3. Kalman-type Filters for INS Alignment
4. Potential Accuracy of INS Alignment
5. Suboptimal Nonlinear Filters for INS Alignment

## **Chapter 8. Nonlinear Filtering for Radioengineering Problems**

### Introduction

1. Peculiarities of Nonlinear Filtering Problems for Radioengineering
2. Gaussian Approximation for Radioengineering Problems
3. Non-Gaussian Approximation for Radioengineering Problems.
4. Gaussian Sum Approximation Based on Additional Variables
5. Cramer-Rao Bounds for Radioengineering Problems
6. Nonlinear Filtering for Satellite Navigation
7. Nonlinear Filtering in Matching Random Sequences and Processes

## **Appendix. Designations**