CONTENTS

Introduction 1

CHAPTER I
Properties of Maximum Likelihood Function for a Gaussian Time Series 35

1. General Expression for the log Likelihood 35
2. Asymptotic Expression for the "Principal Part" of the log Likelihood 50
3. The Asymptotic Differentiability of Gaussian Distributions with Spectral Densities Separated from Zero 59
4. The Asymptotic Differentiability of Gaussian Distributions with Spectral Densities Possessing Fixed Zeros 67

Appendix 1 73
Appendix 2 78
Appendix 3. Remarks and Bibliography 93

CHAPTER II
Estimation of Parameters by Means of P. Whittle's Method 102

1. Asymptotic Maximum Likelihood Estimators 102
2. Properties of Asymptotic Maximum Likelihood Estimators in the Case of Strictly Positive Spectral Density 104
3. Consistency, Asymptotic Normality, and Asymptotic Efficiency of the Estimator $\bar{\theta}$ in the Case of Spectral Density Possessing Fixed Zeros 110
4. Examples of Determination of Asymptotic Maximum Likelihood Estimators 115
5. Asymptotic Maximum Likelihood Estimator of the Spectrum of Processes Distorted by "White Noise" 128
6. Least-Squares Estimation of Parameters of a Spectrum of a Linear Process 139
7. Estimation by Means of the Whittle Method of Spectrum Parameters of General Processes Satisfying the Strong Mixing Condition 149

Appendix 1 151
Appendix 2 166
Appendix 3. Remarks and Bibliography 182

CHAPTER III
Simplified Estimators Possessing "Nice" Asymptotic Properties 198

1. Asymptotic Properties of Simplified Estimators 198
2. Examples of Preliminary Consistent Estimators 210
3. Examples of Constructing Simplified Estimators 222
Appendix 1. Remarks and Bibliography 234

CHAPTER IV
Testing Hypotheses on Spectrum Parameters of a Gaussian Time Series 236

1. Testing Simple Hypotheses 236
2. Testing Composite Hypotheses (The Case of a Sequence of General "Asymptotically Differentiable Experiments") 247
3. Testing of Composite Hypothesis about a Parameter of a Spectrum of a Gaussian Time Series 258
Appendix 1. Remarks and Bibliography 265

Chapter V
Goodness-of-Fit Tests for Testing the Hypothesis about the Spectrum of Linear Processes 273

1. A Class of Goodness-of-Fit Tests for Testing a Simple Hypothesis about the Spectrum of Linear Processes 273
2. χ^2 Test for Testing a Simple Hypothesis about the Spectrum of a Linear Process 277
3. Goodness-of-Fit Test for Testing Composite Hypotheses about the Spectrum of a Linear Process 284
Appendix 1. Remarks and Bibliography 300

Bibliography 306

Index 321