

Contents

Preface — V

Introduction — 1

1 Discrete model of random oscillations — 7

- 1.1 Random variable and function — 7
- 1.2 Random process and linear series — 17
- 1.3 Equivalence of the $AR(2)$ process to random oscillations — 23

2 Estimation of random oscillation characteristics — 29

- 2.1 Criterion of maximum likelihood — 30
- 2.2 Estimation of Yule model factors — 33
- 2.3 Influence of additive broadband noise — 38
- 2.4 Processing of multicomponent signals — 41

3 Estimates accuracy — 45

- 3.1 Optimal sampling of continuous realizations — 46
- 3.2 Statistical error of estimates — 49
- 3.3 Bias of decrement estimates — 56
- 3.4 Identification of oscillations — 61

4 Experimental validation of autoregressive method — 65

- 4.1 Digitization of measurement signals — 65
- 4.2 Metrology of autoregressive method — 68
- 4.3 Analysis of combustion noise — 70
- 4.4 Contactless measurements of blade oscillation characteristics — 75
- 4.5 Application of tracking filter to vibration signals — 80

References — 87

Index — 89