

CONTENTS

I. INTRODUCTION	1
I.1. Motivation	1
I.2. Linear time series models	2
I.3. Parameter estimation in univariate non-negative ARMA models	4
I.4. Parameter estimation in multivariate non-negative ARMA models	7
I.5. Content of the book	9
II. PARAMETER ESTIMATION IN ARMA(1, q) MODEL	10
II.1. Assumptions	10
II.2. Preliminaries	15
II.3. Main results	19
II.4. Simulation study	33
III. PARAMETER ESTIMATION IN ARMA(p, q) MODEL	36
III.1. Assumptions	36
III.2. Preliminaries	36
III.3. Main results	39
III.4. Estimating parameters in selected ARMA models	42
· III.4.1. Model AR(1)	43
· III.4.2. Model AR(2)	43
· III.4.3. Model MA(1)	45
· III.4.4. Model MA(2)	45
· III.4.5. Model ARMA(1,1)	47
· III.4.6. Model ARMA(2,1)	49
· III.4.7. Model ARMA($p,1$)	53
III.5. Simulation experiments	63
IV. IMPROVEMENT OF ESTIMATION IN MA(1) MODEL	64
IV.1. Assumptions	64
IV.2. Preliminary ideas	65
IV.3. Main results	65
IV.4. Simulations	70
V. PARAMETER ESTIMATION IN MULTIVARIATE MODELS	75
V.1. General model	75
V.2. Model MA(1)	76
· V.2.1. Preliminaries	76
· V.2.2. Main results	78
· V.2.3. Simulations	80
V.3. Autoregressive models	82
· V.3.1. Model AR(1)	82
· V.3.2. Model AR(2)	83
· V.3.3. Method of linear programming	89

VI. RESULTS OF DATA ANALYSIS	91
VI.1. Results for environmental and financial data - univariate models	91
· VI.1.1. Some remarks concerning methods and software	91
· VI.1.2. Series PRAHA	92
· VI.1.3. Series HURBANOVO	95
· VI.1.4. Series ENERGETIKA	99
· VI.1.5. Conclusions	102
VI.2. Results for financial data - multivariate models	103
· VI.2.1. Univariate AR(1) models	103
· VI.2.2. Multivariate AR(1) model	106
· VI.2.3. Multivariate AR(2) model	108
REFERENCES	111