

CONTENTS

Series Editors Preface	v
Preface to the English Edition	vii
Preface	viii

Chapter 1

Statistical Models and Information Criteria	1
1.1 Probability distributions	1
1.1.1 Discrete distributions	1
a. Binomial distribution	1
b. Multinomial distribution	3
1.1.2 Continuous distributions	4
a. Uniform distribution	4
b. Normal distribution	5
c. Multidimensional normal distribution	6
d. Chi-square distribution	7
1.2 Information criteria	7
1.2.1 Comparing the goodness of fit of models — In the case where the true distribution is known	7
1.2.2 Comparing the goodness of fit of models — In the case where the true distribution is unknown	8
1.2.3 Comparing the goodness of fit of models — In the case where the values of parameters of an assumed model are unknown	9
1.2.4 Comparing the goodness of fit of models — In the case where there are several models	11
1.2.5 Comparing the goodness of fit of models — In the case of Bayesian models	15

Chapter 2

Variable Selection for Categorical Data	19
2.1 Check of independence	19

CONTENTS

2.2	Comparison of contingency tables (1)	
	— Selection of an optimal explanatory variable . . .	24
2.3	Comparison of contingency tables (2)	
	— Selection of an optimal categorization	32
2.4	Relation to other methods	39
2.4.1	Comparison with descriptive statistical methods . . .	39
2.4.2	Comparison with inferential statistical methods . . .	42
a.	Considerations concerning criteria to evaluate the goodness of fit	43
b.	Considerations concerning the construction of models	48
 Chapter 3		
CATDAP	and Its Applications	53
3.1	Construction of CATDAP	53
3.2	Application to social research data	56
3.2.1	Social stratum identification and social class identification	56
3.2.2	Cross-national comparison of social stratum identification	63
3.2.3	The public's feelings toward business change	71
3.3	Application to medical data	73
 Chapter 4		
Bayesian Binary Regression — Univariate Case		81
4.1	Introduction	81
4.2	A Bayesian model	87
4.3	Numerical computation	90
4.4	Examples	96
4.5	Discussion	111
 Chapter 5		
Histogram and Bayesian Density Estimator		117
5.1	Search for an optimal histogram	117
5.2	A Bayesian density estimator	123
5.2.1	Introduction	123
5.2.2	A Bayesian model	124
5.2.3	Numerical computation	126
5.2.4	Estimation procedure for a general data set	131
5.3	Examples and consideration	134

CONTENTS

5.3.1	Examples	134
5.3.2	Discussion	138
Chapter 6		
	Bayesian Binary Regression — Bivariate Case	149
6.1	A Bayesian model	149
6.2	Numerical computation	153
6.3	Examples	156
Appendix		
	FORTRAN Program — CATDAP-02	163
a.	How to operate CATDAP-02	163
b.	How to write a data descriptive file	165
c.	Possible output	167
d.	Sample input and sample output	167
e.	Source list of CATDAP-02	170
	References	207
	Index	213