

## CONTENTS

CHAPTER 1. DISCRETE MARKOV PROCESSES : DEFINITIONS	1
1. Introduction	1
2. Markov chains	3
3. Poisson process and discrete Markov process	12
4. Alternative definitions of a Markov process and their equivalence.	25
5. Strong Markov property	37
6. Finite dimensional distributions	40
CHAPTER 2. THE TRANSITION PROBABILITY FUNCTION	50
1. Introduction	50
2. Analytic properties	51
3. Solution of forward and backward equations	59
4. Evaluation of the transition probabilities	67
5. Finite birth and birth-death processes	76
6. The sample paths of a finite Markov process	95
CHAPTER 3. CLASSIFICATION OF STATES	107
1. Introduction	107
2. Associated Markov chains	107
3. Essential and inessential states	111
4. Persistent and transient states	118
5. Asymptotic properties	129
6. Invariant distribution	136
7. Invariant distribution : birth-death processes	142

CHAPTER 4. STATISTICAL PROPERTIES	147
1. Introduction	147
2. Moments of transition counts and sojourn times	152
3. Probability distributions associated with transition counts and sojourn times	164
4. Moments of the first passage transition counts: Irreducible Markov process.	171
5. Mean and variance of first passage times	179
6. Transition counts for an absorbing Markov process	185
7. Sojourn times for absorbing Markov processes	189
8. Examples	195
/	
CHAPTER 5. STATISTICAL INFERENCE	203
1. Introduction	203
2. The likelihood function	205
3. ML estimation	211
4. Asymptotic properties of ML estimators	215
5. Strong consistency of the ML estimators	226
6. ML estimation : parametric case	239
7. Asymptotic distribution of ML equation estimators	250
8. Tests of hypotheses	260
9. Concluding remarks	275
PROBLEMS	278
REFERENCES	299
AUTHOR INDEX	305
SUBJECT INDEX	307