

C O N T E N T S

| | |
|-------------------|------------|
| LIST OF NOTATIONS | <i>vii</i> |
|-------------------|------------|

CHAPTER 1 : INTRODUCTION

| | |
|---|----|
| 1.1 The need for non-Gaussian models | 1 |
| 1.2 Models for continuous random phenomenon | 2 |
| 1.2.1 Autoregressive processes | 2 |
| 1.2.2 MINAR(1) processes | 6 |
| 1.2.3 MAXAR(1) processes | 12 |
| 1.2.4 AR(1) processes with random coefficient | 13 |
| 1.2.5 Some more models | 15 |
| 1.3 Models for discrete random phenomenon | 15 |
| 1.3.1 Integer valued autoregressive processes: INAR(1) | 16 |
| 1.3.2 Discrete minification processes | 18 |
| 1.3.3 INAR(1) processes with random coefficient | 19 |
| 1.4 Problems taken up in the thesis | 20 |
| 1.5 Organization of the thesis | 25 |

CHAPTER 2 : MODELLING AR PROCESSES : A UNIFIED APPROACH

| | |
|--------------------------|----|
| 2.1 Introduction | 29 |
| 2.2 The unified approach | 29 |
| 2.3 Some new models | 35 |

CHAPTER 3 : MODELS FOR DISCRETE VARIATE TIME SERIES

| | |
|---|----|
| 3.1 Introduction | 37 |
| 3.2 Alternate probability generating function | 39 |
| 3.3 Integer valued AR processes (INAR) | 42 |
| 3.4 A discrete minification process | 46 |
| 3.5 MINAR processes with discrete marginals | 48 |
| 3.6 A geometric MINAR process | 62 |
| 3.6.1 The process | 62 |
| 3.6.2 The joint distribution of X_n and X_{n-j} | 65 |
| 3.6.3 A simulation study | 68 |
| 3.7 Discrete maximum processes | 72 |
| 3.7.1 Discrete maximum process of Alpuim | 72 |
| 3.7.2 Maximum process - I | 74 |
| 3.7.3 Maximum process - II | 80 |

CHAPTER 4 : CHARACTERIZATIONS OF AR PROCESSES

| | | |
|-------|--|-----|
| 4.1 | Introduction | 91 |
| 4.2 | Characterization of AR processes with exponential marginals | 94 |
| 4.2.1 | A Characterization of exponential MINAR process | 94 |
| 4.2.2 | A Characterization of EAR(1) process | 96 |
| 4.3 | Characterizations of AR processes with Geometric marginals | 98 |
| 4.3.1 | A Characterization of geometric INAR process | 98 |
| 4.3.2 | Characterizations of geometric MINAR process | 99 |
| 4.4 | A Pareto MINAR process and related characterizations | 104 |
| 4.4.1 | A Pareto process | 104 |
| 4.4.2 | Semi-Pareto processes | 105 |
| 4.4.3 | A necessary and sufficient condition for stationarity | 110 |
| 4.4.4 | Some characterization results | 112 |
| 4.5 | Characterization of an AR process with Poisson marginals | 124 |
| 4.5.1 | The new thickening operator θ_* | 124 |
| 4.5.2 | A stationary process with poisson marginals and a characterization | 127 |
| 4.5.3 | Modified definition of thickening and a related stationary process | 128 |

CHAPTER 5 : ANALOGUES OF GEOMETRIC STABILITY AND RELATED AR PROCESSES

| | | |
|---------------------|---|-----|
| 5.1 | Introduction | 130 |
| 5.2 | Geometrically stable laws | 134 |
| 5.3 | Discrete geometric stability | 144 |
| 5.4 | Discrete Semi-Stability and Geometric discrete Semi-Stability | 148 |
| 5.5 | Domain of discrete attraction and Geometric domain of discrete attraction | 153 |
| 5.6 | Similar Concepts in the scheme of Maxima/Minima | 158 |
| 5.7 | Stationary autoregressive processes | 160 |
| BIBLIOGRAPHY | | 165 |