

# Contents

PREFACE	v
INTRODUCTION	vii
LIST OF CONTRIBUTORS	xi
CHAPTER 1. STATISTICS AND PROBABILITY by R.B. McCammon	1
1.1 Sample Mean and Variance	1
1.2 Elements of Probability	4
1.3 Problems	6
1.4 Searching for Dikes	7
1.5 Rocks in Thin Section	13
References	19
CHAPTER 2. R- AND Q-MODE FACTOR ANALYSIS by J.E. Klovan	21
2.1 Meaning of Factor	21
2.2 Data Matrices	22
2.3 Factor Analytic Modes	23
2.4 The R-Mode Model	24
2.5 A Practical Example	36
2.6 Factors	37
2.7 The Q-Mode Model	45
2.8 An Example	51
2.9 Oblique Rotation	54
2.10 Practical Examples	57
References	60
APPENDIX 1: A Primer on Matrix Algebra	62

CHAPTER 3.	SOME PRACTICAL ASPECTS OF TIME SERIES ANALYSIS by William T. Fox	70
3.1	Generalities	70
3.2	Polynomial Curve Fitting	72
3.3	Iterated Moving Averages	74
3.4	Fourier Analysis	78
3.5	An Application	81
	References	88
CHAPTER 4.	MARKOV MODELS IN THE EARTH SCIENCES by W.C. Krumbein	90
4.1	Fundamentals	90
4.2	A Spectrum of Models	91
4.3	The Markov Chain	92
4.4	Geometric Distribution	94
4.5	Probability Trees	95
4.6	Embedded Markov Chains	97
4.7	Extensions	99
	References	101
	Bibliography	102
CHAPTER 5.	A PRIORI AND EXPERIMENTAL APPROXIMATION OF SIMPLE RATIO CORRELATIONS by Felix Chayes	106
5.1	Ratio Correlations	106
5.2	RTCRSM2	111
5.3	UNNO AND RANEX	112
5.4	Comments on Usage	113
	References	114
	APPENDIX 1: RTCRSM2 Program	115
	APPENDIX 2: RANEX and UNNO Programs	129
CHAPTER 6.	COMPUTER PERSPECTIVES IN GEOLOGY by Daniel F. Merriam	138
6.1	Generalities	138
6.2	Early Beginnings	139
6.3	Usage in General	139
6.4	Usage in Geology	141
6.5	Patterns and Trends	146
	References	149

## CONTENTS

CHAPTER 7. PROBLEM SET IN GEOSTATISTICS by R.B. McCammon	150
7.1 A Paleontologist's Dilemma	150
7.2 Particle Size Distribution in Thin Section	150
7.3 Particle Diameter Sampling Experiment	152
7.4 Linear Regression of Porosity Data. I	153
7.5 Linear Regression of Porosity Data. II	155
7.6 Sunspots and Earthquakes	156
7.7 A Beginning and an End	157
7.8 Helmert Transformation	158
7.9 A Spine to Remember	160
7.10 Nearshore-Offshore Sediments	162
References	163