

CONTENTS

<i>Chapter</i>		<i>Page</i>
1	DEFINITIONS AND SOME PRELIMINARY RESULTS	1
	1.1 Notation and general introduction	1
	1.2 The generalized inverse	3
	1.3 One-condition generalized inverses	6
	1.4 Solution of linear equations	9
	1.5 Two-condition generalized inverses	12
	1.6 Three-condition generalized inverses	15
	1.7 Discussion	15
2	THEORETICAL PROPERTIES OF GENERALIZED INVERSES	17
	2.1 Introduction	17
	2.2 Results on rank and idempotency	17
	2.3 Results on symmetry	18
	2.4 Commuting generalized inverses	19
	2.5 Latent roots and vectors	23
	2.6 Relationships between types of generalized inverses	24
	2.7 Generalized inverses of product matrices	30
	2.8 Special results on g_1 -inverses	32
	2.9 Miscellaneous results	35
3	GENERALIZED INVERSES OF PARTITIONED AND BORDERED MATRICES	37
	3.1 Introduction	37
	3.2 Matrices partitioned into two submatrices	38
	3.3 Partitioned positive semidefinite matrices	45
	3.4 Bordered matrices	48
	3.5 Some remarks on generalized inverses of partitioned and bordered matrices	53
4	METHODS OF COMPUTING GENERALIZED INVERSES	55
	4.1 Introduction	55
	4.2 The g -inverse	56

Chapter	Page
4.3 g_1 -inverses	61
4.4 g_2 -inverses	66
4.5 g_3 -inverses	67
4.6 The Cholesky technique	67
5 SINGULAR NORMAL VARIATES	70
5.1 Conditional means and variances of the normal multivariate distribution	70
5.2 Regression properties of the multivariate normal distribution	72
5.3 Reversible transformations of singular to nonsingular variates	74
5.4 Conditions for a second-degree polynomial in normal variates to have noncentral χ^2 distribution	77
6 THE LINEAR MODEL OF LESS THAN FULL RANK	80
6.1 Introduction	80
6.2 Estimable linear functions	81
6.3 The method of imposed linear restrictions	90
6.4 Relationship between estimability and linear restrictions	93
6.5 Linear models with <i>a priori</i> linear constraints	98
6.6 Some aspects of partitioned linear models	101
6.7 Some statistical interpretations of g -inverses in linear estimation procedures	106
7 THE LINEAR MODEL WITH SINGULAR VARIANCE MATRIX	109
7.1 Introduction	109
7.2 The Goldman–Zelen method	110
7.3 The Zyskind–Martin method	114
CONCLUDING REMARKS	118
REFERENCES	119
INDEX	125