

# CONTENTS

<b>Preface</b>	vii
<b>1. Introduction, Preliminaries</b>	1
Convex sets	3
Convex functions	4
Quasi-convex and pseudo-convex functions	10
Postscript	15
<b>2. Theorems of Alternatives and of Duality</b>	17
Theorems of alternatives	17
The duality theorem of linear programming	24
The minimax theorem	29
Convex cones and convex polyhedra	33
Postscript	38
<b>3. Linear Programming and Quadratic Programming</b>	39
Linear programming	39
Feasible variables and basic variables	39
Duality	45
The Lagrangean	50
Quadratic programming	52
Complementarity	55
<b>4. Theorems of Sufficiency and Theorems of Necessity</b>	58
Saddle point theorems	67
Stability	70
Necessity theorems	73

Constraint qualifications	75
A special problem	84
Generalized Kuhn–Tucker theory	85
Test of constraint qualifications	92
<b>5. Duality</b>	<b>96</b>
Saddle point theorems	96
Duality theorems	101
Symmetric programs	108
Conjugate functions	110
<b>References</b>	<b>112</b>
<b>Index</b>	<b>117</b>