

## CONTENTS

## PREFACE

## 1. GEOMETRY AND LINEAR ALGEBRA

1.1	Convex Sets	1
1.2	Independence, Bases and Dimension	9
1.3	Matrices and Vectors	11
1.4	Linear Systems	14
1.5	Pivotal Condensation	20
1.6	Vertices	24
1.7	Vector Orderings	27
1.8	Exercises	29

## 2. LINEAR PROGRAMMING

2.1	LP Problems	36
2.2	Primal and Dual Problems	42
2.3	A Simplex Method	47
2.4	The First Phase	55
2.5	Exercises	69

## 3. ELEMENTARY CONVEX ANALYSIS

3.1	Separation Properties	76
3.2	Convex Functions	83
3.3	Fenchel Transforms	89
3.4	Extremal and Smoothness Properties	95
3.5	Exercises	98

## 4. NONLINEAR PROGRAMMING

4.1	Introduction	102
4.2	Duality Theory	106
4.3	Lagrangians	113
4.4	The Canonical Convex Problem	116
4.5	Quadratic Programming	123
4.6	Exercises	131

## COMMENTS ON EXERCISES

	Comments on Exercises 1.8	135
	Comments on Exercises 2.5	138
	Comments on Exercises 3.5	140
	Comments on Exercises 4.6	142

## REFERENCES

145

## INDEX

147