

Contents

Acknowledgements.....	xi
Preface.....	xiii
Preface by the editor.....	xvii
An Obituary of Loo-Keng Hua, by H. Halberstam.....	xix

CHAPTER 0

INTRODUCTION

§ 0.1 Three principles.....	1
§ 0.2 Looking for problems in the literature.....	3
§ 0.3 Looking for problems in the workshop.....	5
§ 0.4 Optimum seeking methods (O.S.M).....	8
§ 0.5 The Fibonacci search.....	10
§ 0.6 The golden number and numerical integration.....	11
§ 0.7 Overall planning methods.....	13
§ 0.8 On the use of statistics.....	18
§ 0.9 Concluding remarks.....	23

CHAPTER 1

ON THE CALCULATION OF MINERAL RESERVES AND HILLSIDE AREAS ON CONTOUR MAPS

§ 1.1 Introduction.....	25
§ 1.2 Calculation of mineral reserves.....	26
§ 1.3 Calculation of hillside areas.....	32
References.....	40

CHAPTER 2

THE MESHING GEAR-PAIR PROBLEM

§ 2.1	Introduction.	41
§ 2.2	Simple continued fractions.....	42
§ 2.3	Farey series.....	47
§ 2.4	An algorithm for the problem.....	49
§ 2.5	The solution to the meshing gear-pair problem.	51
	References.....	55

CHAPTER 3

OPTIMUM SEEKING METHODS (single variable)

§ 3.1	Introduction.....	57
§ 3.2	Unimodal functions.....	59
§ 3.3	Method of trials by shifting to and fro.	60
§ 3.4	The golden section method.....	61
§ 3.5	The proof of Theorem 3.1.....	63
§ 3.6	The Fibonacci search.....	69
§ 3.7	The proof of Theorem 3.2.....	71
§ 3.8	The bisection method.	74
§ 3.9	The parabola method.	76
	References.....	78

CHAPTER 4

OPTIMUM SEEKING METHODS (several variables)

§ 4.1	Introduction.	79
§ 4.2	Unimodal functions (several variables).....	79
§ 4.3	The bisection method.	81
§ 4.4	The successive approximation method.	85
§ 4.5	The parallel line method.....	87
§ 4.6	The discrete case with two factors.....	89

§ 4.7	The equilateral triangle method.....	91
§ 4.8	The gradient method.....	94
§ 4.9	The paraboloid method.....	95
§ 4.10	Convex bodies.....	99
§ 4.11	Qie Kuai Fa.....	104
§ 4.12	The 0-1 variable method.....	106
	References.....	109

CHAPTER 5

THE GOLDEN NUMBER AND NUMERICAL INTEGRATION

§ 5.1	Introduction.....	111
§ 5.2	Lemmas.....	113
§ 5.3	Error estimation for the quadrature formula.....	117
§ 5.4	A result for Ω and a lower bound for the quadrature formula.....	120
§ 5.5	Remarks.....	122
	References.....	124

CHAPTER 6

OVERALL PLANNING METHODS

§ 6.1	Introduction.....	125
§ 6.2	Critical Path Method.....	125
§ 6.3	Float.....	127
§ 6.4	Parallel operations and overlapping operations.....	130
§ 6.5	Manpower scheduling.....	134
	References.....	136

CHAPTER 7

PROGRAM EVALUATION AND REVIEW TECHNIQUE (PERT)

§ 7.1	Introduction.....	137
-------	-------------------	-----

§ 7.2	Estimation of the probability.....	138
§ 7.3	Computation process.....	142
§ 7.4	An elementary approach.....	145
§ 7.5	Remarks.....	147
	References.....	149

CHAPTER 8

MACHINE SCHEDULING

§ 8.1	Introduction.....	151
§ 8.2	Two-machine problem.....	151
§ 8.3	A lemma.....	154
§ 8.4	Proof of Theorem 8.1.....	156
	References.....	158

CHAPTER 9

THE TRANSPORTATION PROBLEM (GRAPHICAL METHOD)

§ 9.1	Introduction.....	159
§ 9.2	One cycle.....	167
§ 9.3	Proof of Theorem 9.1.....	170
	References.....	172

CHAPTER 10

THE TRANSPORTATION PROBLEM (SIMPLEX METHOD)

§ 10.1	Introduction.....	173
§ 10.2	Eliminated unknowns and feasible solutions.....	179
§ 10.3	Criterion numbers.....	182
§ 10.4	A criterion for optimality.....	188
§ 10.5	Characteristic numbers.....	189
§ 10.6	Substitution.....	193
§ 10.7	Linear programming.....	197
	References.....	198

CHAPTER 11**THE POSTMAN PROBLEM**

§ 11.1	Introduction.....	201
§ 11.2	Euler paths.....	204
§ 11.3	A necessary and sufficient criterion for an optimum solution.	205
	References.....	208