

CONTENTS

PREFACE

CHAPTER I. THE TRAFFIC PROBLEM AND A FIRST ORDER NONLINEAR EQUATION

1.1	Introduction	1
1.2	Weak solutions	5
1.3	Initial value problem	6
1.4	Initial value problem with shock	15
1.5	Modifications by diffusion and dissipation	27
1.6	Propagation of singularities in derivatives	29
1.7	Computing methods	31

CHAPTER II. ONE DIMENSIONAL GAS DYNAMICS

2.1	Equations of motion	46
2.2	Thermodynamical relations. Entropy	48
2.3	One dimensional flow	50
2.4	Shock conditions ..	55
2.5	Contact discontinuities ..	59
2.6	Shock reflection ..	60
2.7	Hugoniot curve. Shock determinacy ..	62
2.8	Riemann problem ..	68
2.9	Solution of initial value problem ..	73
2.10	Combustion. Detonations and deflagrations	83
2.11	Riemann problem with detonations and deflagrations ..	88
2.12	Internal mechanism ..	89

CHAPTER III. TWO DIMENSIONAL STEADY FLOW

3.1	Equations of motion ..	93
3.2	Classifications of flow equations ..	96

3.3	Supersonic flow	..	97
3.4	Shock polar	..	99
3.5	Equations in the hodograph plane	..	102
3.6	Small disturbance equation	..	106
3.7	Transonic flow	..	107
3.8	General theory of boundary value problems for mixed equations	..	108
3.9	The boundary value problems of transonic wing flow	..	116
3.10	Perturbation boundary value problem		121
3.11	Design by the method of complex characteristics	..	123
3.12	Numerical solution with shocks: Off design computations	..	128
3.13	Nozzle flow	..	131
	BIBLIOGRAPHY	..	134

