

CONTENTS

<i>Preface</i>	<i>page ix</i>
<i>Prologue</i>	<i>xi</i>

Chapter 1. Sound waves

1.1	The wave equation	1
1.2	The speed of sound	5
1.3	Acoustic energy and intensity	11
1.4	The simple source	17
1.5	The acoustic dipole	23
1.6	Compact source regions in general	31
1.7	Compact source regions with dipole far fields	35
1.8	Ripple-tank simulations	41
1.9	Scattering by compact bodies	50
1.10	Quadrupole radiation	57
1.11	Radiation from spheres	65
1.12	Radiation from plane walls	70
1.13	Dissipation of acoustic energy	76
	Exercises on chapter 1	85

Chapter 2. One-dimensional waves in fluids

2.1	Longitudinal waves in tubes and channels	89
2.2	Examples, including elastic tubes and open channels	94
2.3	Transmission of waves through junctions	100
2.4	Propagation through branching systems	107
2.5	Cavities, constrictions, resonators	113
2.6	Linear propagation with gradually varying composition and cross-section	120
2.7	Frictional attenuation	128
2.8	Nonlinear theory of plane waves	137

2.9	Simple waves	144
2.10	Shock waves	152
2.11	Theory of simple waves incorporating weak shock waves	165
2.12	Hydraulic jumps	175
2.13	Nonlinear propagation with gradually varying composition and cross-section	183
2.14	Nonlinear geometrical acoustics	190
	Exercises on chapter 2	199

Chapter 3. Water waves

3.1	Surface gravity waves	204
3.2	Sinusoidal waves on deep water	208
3.3	Sinusoidal waves on water of arbitrary, but uniform, depth	214
3.4	Ripples	221
3.5	Attenuation	229
3.6	Introduction to group velocity	237
3.7	The Fourier analysis of dispersive systems	246
3.8	Energy propagation velocity	254
3.9	Wave patterns made by obstacles in a steady stream	260
3.10	Ship waves	269
	Exercises on chapter 3	279

Chapter 4. Internal waves

4.1	Introduction to internal gravity waves	284
4.2	Combined theory of sound and internal waves	291
4.3	Internal waves in the ocean and in the atmosphere	298
4.4	Introduction to anisotropic dispersion	308
4.5	General theory of ray tracing	317
4.6	Ray tracing in a wind	325
4.7	Steady streaming generated by wave attenuation	337
4.8	Stationary phase in three dimensions	351
4.9	General theory of oscillating sources of waves	361
4.10	Internal waves generated by an oscillating source	373
4.11	Caustics	385
4.12	Wave generation by travelling forcing effects	399
4.13	Waveguides	418
	Exercises on chapter 4	432

Epilogue

Part 1	A variety of waves in fluids	437
Part 2	Nonlinear effects on dispersive wave propagation	450

Bibliography

(indexed as pages *A* to *Q*)

Part 1	Some basic texts	[A] 470
Part 2	Acoustic literature	[C] 472
Part 3	Water-wave literature	[G] 476
Part 4	Stratified-fluids literature	[J] 479
Part 5	A bibliography for the epilogue	[M] 483

<i>Notation list</i>	487
----------------------	-----

<i>Author index</i>	490
---------------------	-----

<i>Subject index</i>	492
----------------------	-----