CONTENTS

1 Classical Dynamics of Particles

Preliminary (Cor	ice	pts	•	•									•		•		•	•	1
Salient Featu	res	of	the	e S	pec	ial	Th	ieoi	ry (of	Rel	ativ	/ity							9
Solved Exam	ple	s			•				•											32
Problems .		•																		41
References																		•	•	44
Bibliography	•	•	•	•	•				•	•	•	•	•	•	•	•	•	•	•	44
	Preliminary (Salient Featu Solved Exam Problems . References Bibliography	Preliminary Con Salient Features Solved Example Problems References . Bibliography .	Preliminary Conce Salient Features of Solved Examples Problems References Bibliography	Preliminary Concepts Salient Features of the Solved Examples . Problems References Bibliography	Preliminary Concepts . Salient Features of the S Solved Examples Problems References Bibliography	Preliminary Concepts Salient Features of the Spec Solved Examples Problems References Bibliography	Preliminary Concepts Salient Features of the Special Solved Examples Problems References Bibliography	Preliminary Concepts.Salient Features of the Special ThSolved Examples.Problems.References.Bibliography.	Preliminary Concepts.Salient Features of the Special TheorySolved ExamplesProblemsReferencesBibliography	Preliminary Concepts	Preliminary Concepts.Salient Features of the Special Theory ofSolved Examples.Problems.References.Bibliography.	Preliminary Concepts . . . Salient Features of the Special Theory of Rel Solved Examples . . Problems . . . References . . . Bibliography . . .	Preliminary Concepts	Preliminary Concepts	Preliminary Concepts .	Preliminary Concepts .	Preliminary Concepts .	Preliminary Concepts	Preliminary Concepts	Preliminary Concepts

2 Lagrangian Dynamics

2.1.	Basic Theory																	•		46
2.2.	Development	an	d	Ext	ens	sior	ı of	f th	le E	Basi	ic I	Гĥе	ory	· .						57
2.3.	Solved Exam	ple	s										•							74
	Problems .	•																		88
	References																			94
	Bibliography	•	•	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	94
			•																	

3 Conservation Laws

3.1.	Relationship of	of (Co	nse	rva	tio	n L	aw	s a	nd	Syn	nm	etry	y							
	Transformation	ons	5								•		•	•							96
3.2.	Conservation	La	iws	s A	sso	cia	ted	wi	th]	Lor	ent	z T	Trai	ısfo	orn	nati	ons	з.			106
3.3.	Solved Exam	ple	s					•						•							109
	Problems .					•															111
	References	•	•		•																111
	Bibliography	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	111

CONTENTS

4 1	The Ca	nonical l	Formalism
-----	--------	-----------	-----------

4.1.	Basic Theory																				112
4.2.	Development	an	d]	Ext	ens	sion	of	th:	e E	Basi	c 7	Гhe	ory	•							128
4.3.	Solved Examp	ples	5			۰.					•									•	143
	Problems .	•	•								•					•	•	•		•	163
	References	•	•				•	•			•	•	•	•	•	•	•	•	•	•	166
	Bibliography	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•	167

5 Many-Particle Dynamics

5.1.	Construction of a Many-Particle Dynamics Compatible with																					
	Einstein's	Spe	ecia	al	Th	eor	ус	of 1	Rel	ativ	/ity	•										168
5.2.	Wigner-Va	ın l	Da	m	Th	eor	y ('	Tw	o-E	Bod	уN	/lot	ion	wł	ien							
	$m_2 \ge m_1$)	•	•					•				•						•	•			188
	References		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	191

6 Group Theory

6.1. 6.2. 6.3.	Group Theory in Classical Mechanics192Factoring the Dynamical Matrix193Constructing a Canonical Formalism from a Symmetry Group218Problems222References223	23378
Appendix /	A Some Useful Mathematics	0
Appendix	B Derivation of Lagrange's Equations from Newton's Laws . 237	7
Appendix	C Leutwyler's Proof of the No-Interaction Theorem 242	2
Appendix	D Euler Angles	0
Appendix	E Some Group Theory	2
Appendix	F Point Groups and Their Character Tables	7
Index		7

viii