

TABLE OF CONTENTS

	Page
CHAPTER 1. GENERALITIES AND THE JACOBI METHOD	5
Generalities	5
Examples of Canonical Equations	6
First Jacobi Theorem	10
Second Jacobi Theorem; Changes of Variables	11
Special Changes of Variables	12
Keplerian Motion	15
Special Case of the Problem of Three Bodies	17
Use of Keplerian Variables	19
General Case of the Problem of Three Bodies	20
General Problem of Dynamics	25
Reduction of the Canonical Equations	26
Reduction of the Problem of Three Bodies	30
Form of the Perturbative Function	32
Invariant Relations	35
CHAPTER 2. SERIES INTEGRATION	37
Definitions and Various Lemmas	37
Cauchy's Theorem	39
Extension of Cauchy's Theorem	44
Applications to the Problem of Three Bodies	47
Use of Trigonometric Series	49
Implicit Functions	52
Algebraic Singular Points	54
Elimination	55
Theorem of the Maxima	57
New Definitions	59
CHAPTER 3. PERIODIC SOLUTIONS	61
Case When Time Does Not Enter Explicitly Into the Equations	69
Application to the Problem of Three Bodies	76
First-Type Solutions	77
Hill's Researches Concerning the Moon	83
Application to the General Problem of Dynamics	88
Case Where the Hessian Is Zero	95
Direct Calculation of Series	97
Direct Demonstration of Convergence	105
Examination of an Important Exceptional Case	110
Solution of the Second Kind	116
Solution of the Third Kind	121
Applications of Periodic Solutions	128
Satellites of Jupiter	129
Periodic Solutions in the Neighborhood of a Position of Equilibrium	131
Moons Without Quadrature	133

	Page
CHAPTER 4. CHARACTERISTIC EXPONENTS	136
Equations of Variation	136
Application to Lunar Theory	138
Equations of Variation of Dynamics	139
Application of the Theory of Linear Substitutions	145
Definition of Characteristic Exponents	148
The Equation Which Defines These Exponents	150
Case Where Time Does Not Enter Explicitly	151
New Statement of the Theorem of Articles 37 and 38	152
Case Where the Equations Admit Uniform Integrals	155
Case of the Equations of Dynamics	163
Changes of Variables	169
Development of Exponents. Calculation of the First Terms	171
Application to the Problem of Three Bodies	186
Complete Calculation of Characteristic Exponents	187
Degenerate Solutions	196
CHAPTER 5. NON-EXISTENCE OF UNIFORM INTEGRALS	201
Non-Existence of Uniform Integrals	201
Case Where the B Vanish	207
Case Where the Hessian is Zero	212
Application to the Problem of Three Bodies	216
Problems of Dynamics Where There Exists a Uniform Integral	220
Nonholomorphic Integrals in μ	224
Discussion of Expressions (14)	226
CHAPTER 6. APPROXIMATE DEVELOPMENT OF THE PERTURBATIVE FUNCTION	233
Statement of the Problem	233
Digression on a Property of the Perturbative Function	235
Principles of the Method of Darboux	241
Extension to Functions of Several Variables	243
Investigation of Singular Points	248
Discussion	256
Discussion of the General Case	266
Application of the Method of Darboux	272
Application to Astronomy	282
Application to Demonstration of the Non-Existence of Uniform Integrals	282
CHAPTER 7. ASYMPTOTIC SOLUTIONS	291
Asymptotic Solutions	291
Convergence of Series	294
Asymptotic Solutions of the Equations of Dynamics	298
Development of These Solutions in Powers of $\sqrt{\mu}$	299

	Page
Divergence of the Series of Article 108	304
New Demonstration of the Proposition of Article 108	306
Transformation of Equations	314
Reduction to the Canonical Form	320
Form of Functions V_i	322
Fundamental Lemma	325
Analogy of the Series of Article 108 With That of Stirling	329