

Contents

Chapter 1. Introduction	1
Chapter 2. Preliminaries	5
2.1. Central Configurations	5
2.2. Moving Coordinates	8
2.3. Invariant Set	9
Chapter 3. Equations of Motion for Collision Orbits and <i>PISPW</i>	11
3.1. Equations of Motion	12
3.2. The Problem of Infinite Spin or Painlevé-Wintner (<i>PISPW</i>)	18
Chapter 4. Resolving <i>PISPW</i>	25
4.1. $n_0 = 0$	26
4.2. $n_0 > 0$	27
4.3. Summary	36
Chapter 5. Manifold of Collision Orbits	37
5.1. $n_0 = 0$	37
5.2. $n_0 > 0$	38
5.3. Analytic Extension	39
Chapter 6. Conclusion and Questions	41
Appendix A. Degeneracy of Central Configurations	43
A.1. Degeneracy of a Constrained Critical Point	43
A.2. Degeneracy of Central Configurations	43
Appendix B. Central Configurations of Four Bodies	47
B.1. Preliminaries	50
B.2. Equilateral Central Configurations	53
B.3. Rhombic Central Configurations	55
B.4. Central Configurations With Degree of Degeneracy Two	58
Appendix C. Diagonalization of the Linear Part	63
Appendix D. Normal Forms	69
Appendix E. Plane Equilibrium Points	75
Bibliography	81