

Contents

Introduction

I Chebyshev systems

| | | |
|----------|---|----------|
| 1 | Universality of ECT-families | 1 |
| 1.1 | Zero equivalence | 1 |
| 1.2 | ECT-systems | 5 |
| 1.3 | Main result of Part I | 11 |
| 1.4 | Characteristic equivalence | 15 |
| 1.5 | Generic case | 23 |
| 1.6 | Nongeneric case | 33 |
| 1.7 | Full differentiable ECT-systems | 39 |
| 1.8 | Deformations of linear ECT-families | 48 |

| | | |
|----------|--|-----------|
| 2 | Pinching the parameter space | 53 |
| 2.1 | Pinched linear ECT-families | 53 |
| 2.2 | Zeros in pinched ECT-families | 68 |
| 2.3 | Deformations of pinched ECT-families | 70 |
| 2.4 | Induced ECT-families | 75 |

II Versal unfolding of the cusp of order n

 79 |

| | | |
|----------|--|-----------|
| 3 | Versal unfolding | 81 |
| 3.1 | Main results of Part II | 81 |
| 3.2 | The Poincaré map | 96 |
| 3.3 | Reduction of the proof of Theorem 1.2. | 108 |
| 3.4 | Reduction of the proof of Theorem 1.1. | 113 |
| 3.5 | Proofs of the reduced statements | 119 |

| | |
|---|------------|
| 4 Proof of Theorem 3.5.1 | 125 |
| 4.1 The space of admissible functions | 125 |
| 4.2 The system \mathcal{O}_m in the complex plane | 135 |
| 4.3 Proof of Theorem 3.5.1 | 136 |
| 4.4 The saddle-loop bifurcation | 140 |
| Appendix | 145 |
| Bibliographic notes | 147 |
| References | 149 |