Contents

Introduction **1**

Chapter I Preliminaries

1. Riemannian manifolds 5
2. Almost complex and symplectic manifolds 7
3. J-holomorphic maps 10
4. Riemann surfaces and hyperbolic geometry 11
5. Annuli 17

Chapter II Estimates for area and first derivatives

1. Gromov's Schwarz- and monotonicity lemma 21
2. Area of J-holomorphic maps 22
3. Isoperimetric inequalities for J-holomorphic maps 23
4. Proof of the Gromov-Schwarz lemma 30

Chapter III Higher order derivatives

1. 1-jets of J-holomorphic maps 35
2. Removal of singularities 41
3. Converging sequences of J-holomorphic maps 45
4. Variable almost complex structures 46

Chapter IV Hyperbolic surfaces

1. Hexagons 49
2. Building hyperbolic surfaces from pairs of pants 55
3. Pairs of pants decomposition 59
4. Thick-thin decomposition 68
5. Compactness properties of hyperbolic structures 70

Chapter V The compactness theorem

1. Cusp curves 79
2. Proof of the compactness theorem 82
3. Bubbles 91

Chapter VI The squeezing theorem

1. Discussion of the statement 99
2. Proof modulo existence result for pseudo-holomorphic curves 102
3. The analytical setup: A rough outline 104
4. The required existence result 110

Appendix A The classical isoperimetric inequality **115**

Appendix B The C^k-topology **117**

References on pseudo-holomorphic curves **121**

Bibliography **125**

Index **129**