Complex Geometry

Sommersemester 2014

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1. Classical Results in One Complex Variable

1.1. **The Cauchy-Riemann Equations.**

1.2. **Runge, Mittag-Leffler, Weierstrass Theorems.**

2. Holomorphic Functions of Several Variables

2.1. **The Cauchy Integral Formula.**

2.2. **The Hartogs Extension Theorem.**

2.3. **Subharmonic and Plurisubharmonic Functions.**

2.4. **Holomorphic Convexity and Pseudoconvexity.**

2.5. **Stein Manifolds.**

3. Complex Spaces

3.1. **Analytic Sets, Weierstrass Preparation Theorem.**

3.2. **Presheaves, Sheaves, complex spaces.**

4. Vector bundles and Connections

4.1. **Connections and Curvature.**

4.2. **Kähler metrics, Kähler Identities.**

4.3. **Bochner-Kodaira-Nakano formula.**

4.4. **Line bundles, divisors and blowing-up.**

5. Sheaves and Cohomology

5.1. **Acyclic Resolutions.**

5.2. **The De Rham-Weil Isomorphism Theorem.**

6. Hodge Theory

6.1. **Elliptic Differential Operators.**

6.2. **Harmonic Forms and Cohomology.**

6.3. **Hodge Decomposition on Kähler manifolds.**

7. Positive Vector Bundles and Vanishing Theorems

7.1. **Bochner-Kodaira Vanishing Theorem.**

7.2. **Kodaira Embedding Theorem.**