COMPLEX ANALYTIC AND DIFFERENTIAL GEOMETRY

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Abstract

These lectures aim to provide an introduction to complex analysis and geometry in several variables. We shall cover the following topics:

(1) Plurisubharmonic functions
- Holomorphic functions, Hartogs phenomenon
- Plurisubharmonic functions, Lelong numbers
- Pseudoconvex domains, Levi problem

(2) Positive currents
- Forms with distribution coefficients
- Skoda's extension and Siu decomposition theorems
- Intersection of positive currents

(3) Complex manifolds
- Examples and basic constructions
- Holomorphic vector bundles
- Quasiplurisubharmonic functions

(4) Curvatures
- Hermitian metrics, Chern connection, first Chern class
- Kähler metrics, Ricci curvature
- Ample line bundles, Kodaira embedding theorem

Prerequisites

Differential calculus and geometry, complex analysis of one variable.

References

[1] J.-P. Demailly, Complex Analytic and Differential Geometry, available online: https://www-fourier.ujf- grenoble.fr/ demailly/manuscripts/agbook.pdf

[2] L.Hörmander, Notions of convexity. Progress in Mathematics, 127. Birkhäuser Boston, Inc., Boston, MA, 1994. viii+414 pp.

[3] C. Voisin, Hodge theory and complex algebraic geometry. I. Cambridge University Press, Cambridge, 2002. x+322 pp