

Introduction to complex geometry

Dan Popovici

Abstract:

- Holomorphic functions of several complex variables: definitions, basic properties;
- Laplace operator, Green-Riesz integration and representation formulae, subharmonic and plurisubharmonic functions;
- basic material on currents;
- notion of almost complex and complex structure;
- complex analytic manifolds, smooth and holomorphic complex vector bundles, Hermitian metrics on complex vector bundles, notions of connection and curvature (generalities and the notion of Chern connection of a holomorphic Hermitian vector bundle);
- introduction to the Hodge theory of compact Kaehler manifolds (notion of Kaehler metric, examples of Kaehler and non-Kaehler manifolds, Hodge isomorphism for arbitrary compact Hermitian manifolds, Hodge decomposition and symmetry for compact Kaehler manifolds). I will do the details of what is needed from the theory of elliptic operators (including Garding's elliptic estimates) before starting the details of Hodge theory.

Bibliography :

1. J.-P. Demailly — *Théorie de Hodge L^2 et théorèmes d'annulation* — in “Introduction à la théorie de Hodge”,
2. J. Bertin, J.-P. Demailly, L. Illusie, C. Peters, Panoramas et Synthèses **3**, SMF (1996).
3. J.-P. Demailly — *Complex Analytic and Algebraic Geometry* — <http://www-fourier.ujf-grenoble.fr/~demailly/books.html>