Introduction to Complex Differential Geometry Viviana Del Barco Abstract

After reviewing the notions of complex manifolds and (almost) complex structures, we will introduce and study the notion of vector bundles. In particular, the operations on vector bundles, as well as the notions of connection and curvature will be covered, including Hermitian connections, the Levi-Civita and Chern connections, Chern classes, the expression of the curvature form of complex holomorphic line bundles in terms of the local weights of the fibre metric and its links to positivity and plurisubharmonic functions. This will present us with the opportunity of discussing various positivity concepts for differential forms and currents on complex manifolds. We will conclude with a study of Hermitian metrics on complex manifolds.