Abelian Connections On Complex Manifolds

Isabel Dotti

(joint work with A. Andrada and M.L. Barberis)

Universidad de Cordoba, Argentina

Given a complex structure J on a differentiable manifold M, an affine connection ∇ such that J is parallel and has trivial holonomy will be called *abelian* if the torsion T of ∇ is of type $(1,1)$ with respect to J. Our motivation for studying this class of connections arises from the fact that natural examples of such manifolds are given by Lie groups carrying an abelian complex structure together with the $(-)$-connection, that is, the one whose left invariant vector fields are parallel. One of the results that will be presented in this talk asserts that when the abelian connection ∇ on M is in addition complete and with parallel torsion then $M = \Gamma\backslash G$ with G a simply connected 2-step solvable Lie group, Γ is a discrete subgroup of G, ∇ is induced on the quotient by the $(-)$-connection on G and the complex structure J comes from a left invariant abelian complex structure on G. This class of complex manifolds we are considering can be regarded as the $(1,1)$-counterpart of complex parallelizable ones.