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J. MUCIÑO

Seminar Abstract : DEFORMATION OF HOLOMORPHIC FOLIATIONS HAVING A FIRST INTEGRAL

To the singular holomorphic foliations on the complex projective plane it is associated a discrete invariant given by the Chern class e of the foliation. Under this classification, the singular holomorphic foliations become families $Fol(\mathbb{C}P^2,-e)$ which have a natural structure of complex projective spaces $\mathbb{C}P^n$, where n depends on e.

On the other hand for every family $Fol(\mathbb{C}P^2,-2e)$ we have the class of foliations having holomorphic first integrals (univalued). These foliations can be described by the image of a Grassmanian of two planes on $\mathbb{C}^k$ into $Fol(\mathbb{C}P^2,-2e)$, where k depends on e.

Let F_0 be a holomorphic foliation having a generic holomorphic first integral given by $P/Q:\mathbb{C}P^2 \to \mathbb{C}P^1$ a rational map of degree e. Hence every tangent vector to F_0 in $Fol(\mathbb{C}P^2,-2e)$ can be described by a rational one form of type W/Q^2, where W is a polynomial one-form of certain type. Then we have:

Theorem. *If the tangent vector* W/Q^2 *is such that* $\int_\delta W/Q^2 = 0$ *for every loop* δ *on the leaves of the foliation* F_0, *then the vector* W/Q^2 *is a tangent vector to the space of foliations having holomorphic first integrals.*

This work is a generalisation of Ilyashenko's work in the deformation of polynomial foliations in $\mathbb{C}^2$ having a polynomial first integral.

This work is part of my Ph.D. thesis written under the direction of Xavier Gómez-Mont at the National University, Mexico.

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