COMPLETE HOLOMORPHIC VECTOR FIELDS WHOSE UNDERLYING FOLIATION IS POLYNOMIAL

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Abstract. Let X be a holomorphic vector field on $\mathbb{C}^2$. The solutions of the associated complex ordinary differential equation

$$\dot{z} = X(z),\ X(0) = z \in \mathbb{C}^2,$$

define the local flow φ_z of X. For a fixed point $z \in \mathbb{C}^2$ the local solution φ_z can be extended, by analytic continuation along paths in $\mathbb{C}$, to a maximal domain Ω_z. The map thus defined is said to be a *solution*, and its image C_z is called the *trajectory* of X through z. The vector field is *complete* if $\Omega_z = \mathbb{C}$ for every $z \in \mathbb{C}^2$.

In this talk we will prove that a complete non-polynomial vector field on $\mathbb{C}^2$ whose underlying foliation is polynomial has all its trajectories contained in analytic curves of $\mathbb{C}^2$ and thus it defines a proper flow in $\mathbb{C}^2$. This fact will allow us to extend the classification of complete polynomial vector fields on $\mathbb{C}^2$ given by Marco Brunella.

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