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Local Uniformization of Singular Codimension One Foliations

This is a work in collaboration with Miguel Fernández-Duque. We prove the existence of Local Uniformization, in the classical sense of Zariski, for codimension one singular foliations in projective varieties of any dimension. The precise statement is as follows: Let $K/k$ be the field of rational functions of a projective variety over a base field $k$ of characteristic zero. A singular foliation $F$ of codimension one is defined from a birational viewpoint as a 1-dimensional $K$-vector subspace of the Kähler differentials of $K$ over $k$, satisfying Frobenius integrability condition. We take a $k$-valuation ring $R$ of $K$. We show the existence of a projective model $M$ of $K$ such that $F$ is simple at the center $Y$ of the valuation in $M$. The definitions of simple points for $F$ is compatible with the known ones in the holomorphic case, in particular with the definitions appearing in the statement of Cano’s global reduction of singularities in dimension three.