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The Noether-Fano inequalities for codimension one singular holomorphic foliations.  
(English summary)  

Let \( \mathcal{F} \) be a codimension 1 holomorphic foliation on \( \mathbb{C}\mathbb{P}^N \), and let \( \chi: \mathbb{C}\mathbb{P}^N \to \mathbb{C}\mathbb{P}^N \) be any birational map. The main theorem of this paper gives some conditions on the singularities of \( \mathcal{F} \) at the indeterminacy set of \( \chi \) so that \( \deg(\chi_*\mathcal{F}) \geq \deg(\mathcal{F}) \). The proof is inspired by the proof of the classical Noether-Fano inequalities. It amounts to the study of a suitable \( \mathbb{Q} \)-divisor involving the canonical divisor of \( \mathbb{C}\mathbb{P}^N \) and the normal bundle of \( \mathcal{F} \) in a resolution of the graph of \( \chi \).

Numerous examples are then treated to illustrate this result. The degree of the image of a foliation by the standard Cremona transformation in dimensions 2 and 3, and by the cubo-cubic Cremona map in dimension 3 is computed. A nice and simple criterion for proving the minimality of \( \deg(\mathcal{F}) \) in its birational class is given in dimension 2. It is used to prove the minimality of the degree of some modular foliations considered in [L. G. Mendes and J. V. Pereira, Comment. Math. Helv. 80 (2005), no. 2, 243–291; MR2142243 (2006d:32043)].

Reviewed by Charles Favre

References


Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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