

Holomorphic foliations singular along a positive dimensional subscheme

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Abstract:

A general one-dimensional foliation in the complex projective space has finitely many singularities. For an appropriately good family of subschemes in P^n , we study the loci in the space of foliations of degree d defined by the requirement that the singularities contain a member of the family. We give a formula for the dimensions of such loci. We show that their degrees are expressed by a polynomial in d . We compute it explicitly in a few examples. Next we provide a formula for the number of isolated singular points of a foliation containing a prescribed positive dimensional subscheme in its singular scheme under mild assumptions. We include a result devised by Steven L. Kleiman on a theorem of Bertini suitable for sections of vector bundles with rank equal to the dimension of the base, needed to validate the formulas.