Indices of holomorphic foliations and the bifurcation conjecture

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Abstract: In this talk we revisit local invariants (Gómez-Mont-Seade-Verjovsky, variation, Camacho-Sad and Baum-Bott indices) associated with singular holomorphic foliations on (C2,0) and we provide semi-global formulas for them in terms of the reduction of singularities of the foliation. A key technical ingredient is the Cholesky-type factorization of the intersection matrix of the exceptional divisor, which allows for an explicit control of multiplicities and indices along the resolution process. Using this factorization, we express the Milnor number and other indices as quadratic forms in intersection vectors associated to balanced divisors introduced by Genzmer. As a main application, we address a conjecture posed by Szawlowski concerning pencils of germs of plane holomorphic curves. We prove that the excess of Milnor numbers along the pencil is precisely captured by the invariants derived from our formulas, thereby confirming the conjecture in full generality. This is a joint work with M. Falla Luza, A. Fernández-Pérez and R. Rosas.