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POLYNOMIAL FOLIATIONS OF $\mathcal{R}^2$

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We study the problem of the topological classification of planar polynomial foliations of degree n by giving new lower and upper bounds for the maximum number of inseparable leaves. Moreover, we characterize the planar polynomial foliations that are structural stable under polynomial perturbations and study the exact number of inseparable leaves for this family.

1. Introduction.

In 1940 Kaplan [**14**, **15**] published two large papers on regular families of curves filling the plane, following previous ideas of Whitney [**26**]. A family of curves is called *regular* if it is locally homeomorphic with parallel lines. He proved that each curve of a regular family filling the plane is a homeomorphic line tending to infinity in both directions.

A natural example of generating (orientated) regular families of curves on the plane is given by the solutions of non-singular planar differential systems. Indeed, one major problem from the qualitative theory of differential equations point of view is the topological classification of those differential systems. We say that two planar differential systems are *topologically equivalent* if there exists a homeomorphism on the plane which maps the solution curves of one to the solution curves of the other.

In the second paper, Kaplan characterized the topological classes of regular families based on a certain algebraic structure of the orbits which he called *chordal system*. Ten years later, Markus [**16**] considered the topological classification problem for general (with or without singular points) differential systems on the plane by using different ideas and tools. He pointed out the existence of some key orbits he called *separatrices*. The connected components of the complement of the union of all separatrices are called *canonical regions* where the orbit behavior is tame and all the orbits have the same alpha and omega limit structure. Finally, he defined the *separatrix configuration* of a planar differential systems as the union of all separatrices plus one representative orbit of each canonical region. It follows from Markus and Newmann [**19**] works that two planar differential systems having isolated singular points are topologically equivalent if there