

(Session:Foliations and Singularities) Topological
equivalence at infinity of second order planar
vector fields and its upper principal part

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Let X be a planar polynomial vector field with a fixed Newton polytope Γ . Recently, in Dalbello-Oliveira-Perez(2024), it was proved that the monomials associated to the upper boundary of Γ satisfying some non-degeneracy conditions determine, under topological equivalence, the phase portrait of X in a neighbourhood of the boundary of the Poincaré-Lyapunov disc. In the present talk we show that there exist vector fields of chief interest which do not satisfy such non-degeneracy conditions but still their phase portraits are determined by the monomials associated to the upper boundary of Γ in the Newton polytope of X . This is the case of the second order vector fields of the form

$$x' = y, \quad y' = - \sum_{j=0}^m g_j x^j - \sum_{i=0}^n f_i y^i - y \sum_{l=0}^k h_l x^l \quad (1)$$

with m, n, k integers, g_j, f_i, h_l real numbers for $j = 0, \dots, m, i = 0, \dots, n, l = 0, \dots, k$ and $g_m \neq 0$. Moreover, using such result we are able to completely classify the dynamics near the infinity of systems (1). This is a joint work with Claudia Valls (IST-Lisboa, Portugal).

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