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LIMIT CYCLES FOR FEWNOMIAL DIFFERENTIAL EQUATIONS

In 2015, Chengzhi Li, J. Torregrosa, and myself proved that for complex differential equations with three monomials, $\dot{z} = Az^k\bar{z}^l + Bz^m\bar{z}^n + Cz^p\bar{z}^q$, with k, l, m, n, p, q non-negative integers and $A, B, C \in \mathbb{C}$, there is no upper bound for their number of limit cycles.

More concretely, if $N = \max(k + l, m + n, p + q)$ and $H_3(N) \in \mathbb{N} \cup \{\infty\}$ denotes the maximum number of limit cycles of the above systems with this restriction, we proved that for $N \geq 3$ odd, $H_3(N) \geq (N + 3)/2$.

The aim of this talk is to show our improvements of this lower bound and to present our results for determining $H_3(2)$. These new results are obtained in collaboration with M. J. Álvarez, B. Coll and R. Prohens.