

# Cyclicity of a class of polynomial nilpotent center singularities

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In this work we extend techniques based on computational algebra for bounding the cyclicity of nondegenerate centers to the case of nilpotent centers in a natural class of polynomial systems, those of the form  $\dot{x} = y + P_{2m+1}(x, y)$ ,  $\dot{y} = Q_{2m+1}(x, y)$ , where  $P_{2m+1}$  and  $Q_{2m+1}$  are homogeneous polynomials of degree  $2m + 1$  in  $x$  and  $y$  (and  $P_{2m+1}(1, 0) = 0$ ). We use the method to obtain an upper bound (which is sharp in this case) on the cyclicity of all centers in the cubic family and all centers in a broad subclass in the quintic family.