Nonlinear CR automorphisms of Levi degenerate hypersurfaces and a new gap phenomenon

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Abstract. We give a complete classification of polynomial models for smooth real hypersurfaces of finite Catlin multitype in $\mathbb{C}^3$, which admit nonlinear infinitesimal CR automorphisms. As a consequence, we obtain a sharp 1-jet determination result for any smooth hypersurface with such a model. The results also prove a conjecture of the first author about the origin of such nonlinear automorphisms (AIM list of problems, 2010). As another consequence, we describe all possible dimensions of the Lie algebra of infinitesimal CR automorphisms, which leads to a new "secondary" gap phenomenon.