RECENT DEVELOPMENTS IN THE 2−JET DETERMINATION PROBLEM

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Abstract: Motivated by a question of Dmitri Zaitsev, we first discuss the possible symmetries of a weakly pseudoconvex hypersurface in the light of the general structure results obtained for a holomorphically nondegenerate model in the paper "Chern- Moser operators and polynomial models in CR geometry" by M. Kolar, F. M. and D. Zaitsev, Adv. Math. (2014). We emphasize that this problem has been solved for the case of models given by sums of squares of polynomials by S.-Y. Kim and M. Kolar (2022).

Inspired by several questions of Alexander Tumanov, and also by a question of Laurent Stolovitch, we then discuss open problems in connection with the new developments regarding infinitesimal automorphisms of quadrics in higher codimension. See the paper "Infinitesimal automorphisms of quadrics and second jet determination for CR mappings" by A. Tumanov, arXiv:2207.05307 (2022), the paper "Convergence of the Chern-Moser-Beloshapka normal forms" by B. Lamel and L. Stolovitch, J. reine angew. Math.(2019), and the paper "Construction of counterexamples to the 2−jet determination Chern-Moser theorem in higher codimension" by J. Gregorovič and F. M., Math. Res. Lett. (2022).

This also leads to discuss results obtained in the papers "The 1-jet determination of stationary discs attached to generic CR submanifolds", Complex Anal. Synerg. (2022), and "Explicit construction of stationary discs and its consequences for nondegenerate quadrics", Ann. Sc. Norm. Super. Pisa Cl. Sci. (2023) by Florian Bertrand and F.M.