HYPOELLIPTICITY FOR CERTAIN SYSTEMS OF COMPLEX VECTOR FIELDS

NICHOLAS BRAUN RODRIGUES

Abstract. In 1981, François Treves stated a conjecture for the validity of the smooth hypoellipticity for certain systems defined by complex, real-analytic vector fields. More precisely, given n ($n \geq 1$) linearly independent, real-analytic, pairwise commuting vector fields L_j, defined in an open neighborhood of the origin in $\mathbb{R}^{n+1}$, the overdetermined system $L_j u = f$ would be hypoelliptic in a neighborhood of the origin if and only if any first integral Z of the system, that is, any smooth solution to the homogeneous system $L_j Z = 0$, with $\mathrm{d}Z \neq 0$, is everywhere open. Unless the case when the system is in the so called tube form, for which Maire has proved the validity of the conjecture, the general case is still open.

In this talk I will present a partial answer to the conjecture made by F. Treves. Besides hypoellipticity, we also consider the same regularity problem for Gevrey classes, and regular Denjoy-Carleman, which includes quasi-analytic classes.

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UFSCar
Email address: braun.rodrigues@gmail.com