A nonsmooth Rashevsky-Chow Theorem

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A classical theorem of Rashevsky and Chow states that if a given family of vector fields on a smooth finite-dimensional conneted manifold satisfies the socalled *full rank condition* or *Hörmander's condition*, that is, all these vector fields together with their iterated Lie brackets span the tangent space at each point of the manifold, then it is possible to connect any pair of points in the manifold by a concatenation of a finite number of integral curves, running forward or backward in time, of the given vector fields. Or, in Control Theory terminology, driftless affine-control systems satisfying the full rank condition are controllable.

In this talk, I will speak about a generalization in which we weaken the regularity assumptions of the involved vector fields, so that the involved iterated brackets needed to span the tangent space are merely locally bounded and defined in an almost everywhere sense. The notion of an iterated set-valued bracket defined in [1] plays a crucial role in obtaining this result; this notion of iterated bracket is a nontrivial extension of the set-valued bracket introduced in [2] for the case of a length two bracket.

References

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