On the existence of solutions to differential inclusions with non-convex right-hand side

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Abstract

We propose an approach for proving existence of solutions of differential inclusions with non-convex upper semicontinuous right-hand side, based on the notion "colliding on a set". It is a natural extension of the approach proposed by Bressan for studying the lower semi-continuous case as well as his "patchy vector fields approach". The difference is that the elements of the relatively open partitionings are weakly invariant (in contrast to the strong invariance hypothesis imposed by Bressan) and need not have nonempty interior. Another difference is that we do not impose any smoothness assumptions regarding the boundary of these elements and regarding the vector fields. As an application we discuss the existence of solutions to differential inclusions with monotone right-hand side.

Key Words: differential inclusions with nonconvex right-hand side, existence of solutions; colliding on a set