Nonconvex sweeping processes

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Let H be Hilbert space. In this talk I will speak about the nonconvex sweeping process:

$$\begin{cases} -\dot{x}(t) \in N(C(t), x(t)) \quad \text{a.e.} \quad t \in [T_0, T]; \\ x(T_0) = x_0 \in C(T_0). \end{cases}$$

Here $C\colon [T_0, T] \rightrightarrows H$ is a multivalued map with closed values and $N(S, \cdot)$ denotes the Clarke normal cone to a set S. This differential inclusion was introduced by Moreau [1] in the early 70s to deal with some problems arising in plasticity theory. In the first part of the talk, I will show, in the convex case, the existence and uniqueness of solutions through the so called "catching-up" algorithm. In the second part of the talk, I will discuss some issues related to the nonconvex case.

References

[1] J.J. Moreau, *Rafle par un convexe variable* I. *Exposé 15.* Sém. Anal. Convexe Montpellier, 1971.