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ONE WORLD OPTIMIZATION SEMINAR

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Asymptotic Study of the Sweeping Process

Abstract. Let $r \mapsto S(r)$ be a set-valued mapping with nonempty values and a closed semi-algebraic graph (or more generally, with a graph which is definable in some o-minimal structure). We shall be interested in the asymptotic behavior of the orbits of the so-called sweeping process

$$\dot{x}(r) \in -N_{S(r)}, \quad r > 0. \tag{SPO}$$

Kurdyka (Ann. Inst. Fourier, 1998), in the framework of a gradient dynamics of a C^1-smooth definable function f, generalized the Łojasiewicz inequality and obtained a control of the asymptotic behavior of the gradient orbits in terms of a desingularizing function Ψ depending on f. We shall show that an analogous technique to the one used by Kurdyka can be replicated to our setting for the sweeping dynamics. Our method recovers the aforementioned result of Kurdyka, by simply considering the sweeping process defined by the sublevel sets of the function f: indeed, in this case setting $S(r) = [f \leq r]$, we deduce that the orbits of (SPO) are in fact gradient orbits for f, and the nowadays called (smooth) Kurdyka-Łojasiewicz inequality is recovered.

This talk is based on a work in collaboration with D. Drusvyatskiy (Seattle).

The link of the zoom-room of the meeting and the corresponding password will be announced the day before the talk on the mailing list of the seminar, to which one can subscribe on https://owos.univie.ac.at.