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ONE WORLD OPTIMIZATION SEMINAR

October 18th 2021 @ 15:30 CEST (Central European Summer Time)

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Second Order Dynamics with Closed-Loop Damping

Abstract. We analyze the asymptotic behavior of dissipative inertial continuous dynamics where the damping acts as a closed-loop control. The function to be minimized (not necessarily convex) enters the dynamic through its gradient, which is assumed to be Lipschitz continuous on the bounded subsets.

We first consider the case where the damping term acts as a closed-loop control of the velocity. We analyze the asymptotic convergence and the convergence rates of the trajectories generated by this system. To do this, we use techniques from optimization, control theory, and PDE's: Lyapunov analysis based on the decreasing property of an energy-like function, quasi-gradient and Kurdyka-Lojasiewicz theory, monotone operator theory for wave-like equations. Then, we extend the results to the case where an additional Hessian-driven damping enters the dynamic, which reduces the oscillations. This study naturally leads to similar results for the proximal-gradient algorithms obtained by temporal discretization.

The talk is based on a joint paper with Hedy Attouch (University Montpellier) and Radu Ioan Boţ (University of Vienna).

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.