RATE-INDEPENDENT PROCESSES WITH TIME-DISCONTINUOUS DATA

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Rate-independent processes typically exhibit nonsmooth behavior even if the given data are smooth in time. If the underlying energy functional is nonconvex, then discontinuous solutions appear. Meanwhile, there is a wide variety of solution concepts dealing with such discontinuities. However, in these investigations it is typically assumed that the given data (applied loads in the mechanical context) are in some sense differentiable with respect to time. But this excludes processes, where for instance the loads are switched on or off instantaneously. The aim of this lecture is to discuss for a prototypical rate-independent model with a nonconvex energy functional a solution concept that allows for discontinuous data. The idea is to start from a vanishing viscosity procedure and to identify as precisely as possible the limit process. If time permits the results are put into relation with the results from [1], where the convex case is treated in the framework of Kurzweil-integrals. The lecture relies on joint work with Chiara Zanini (Politecnico di Torino) and discussions with Pavel Krejci.

[1] P. Krejci, M. Liero, Rate independent Kurzweil processes, Appl. Math., Praha, 54(2):117–145,2009.