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ONE WORLD OPTIMIZATION SEMINAR

May 04th, 2020 @ 15:00 CEST (Central European Summer Time)

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Iterated self-mappings in nonlinear spaces: the case of random function iterations and inconsistent stochastic feasibility

Abstract. We study the convergence of random function iterations for finding an invariant measure of the corresponding Markov operator. We call the problem of finding such an invariant measure the *stochastic fixed point problem*. This generalizes earlier work studying the *stochastic feasibility problem*, namely, to find points that are, with probability 1, fixed points of the random functions [Hermer-Luke-Sturm, 2019]. When no such points exist, the stochastic feasibility problem is called *inconsistent*, but still under certain assumptions, the more general stochastic fixed point problem has a solution and the random function iterations converge to an invariant measure for the corresponding Markov operator. There are two major types of convergence: almost sure convergence of the iterates to a fixed point in the case of stochastic feasibility, and convergence in distribution more generally. We show how common structures in deterministic fixed point theory can be exploited to establish existence of invariant measures and convergence of the Markov chain. We show that weaker assumptions than are usually encountered in the analysis of Markov chains guarantee linear/geometric convergence. This framework specializes to many applications of current interest including, for instance, stochastic algorithms for large-scale distributed computation, and deterministic iterative procedures with computational error.

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.