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Abstract zum Vortrag von Dr. Fotios Kasolis am 19. May 2020

On the Dynamics of Deterministic Algorithms

Iterative algorithms are dynamical systems with stable fixed points since they are manufactured so that they converge. For such systems, the Kolmogorov-Sinai entropy is vanishing, while – under mild assumptions – it coincides with the rate of the Rényi entropy of order two. After briefly introducing the required ideas and theorems, an estimate of the Kolmogorov-Sinai entropy is motivated and a novel sampling algorithm, called maximum entropy snapshot sampling (MESS), is developed. A basis is then generated by orthonormalizing the sampled snapshots. Two recently developed and unpublished theorems, regarding the reconstruction error and the time reliability horizon of the generated basis, are presented. Numerical experiments, in the context of image compression and reduced basis model reduction for electromagnetic field problems, verify the performance of the maximum entropy snapshot sampling.