Workshop on Dispersion and fixed volume discrepancy

Moscow, December 13

Laboratory "High-dimensional approximation and applications", Lomonosov Moscow State University

http://approx-lab.math.msu.su/workshop4_eng.html

Monday, December 13

17:20 Vladimir Temlyakov, "Smooth fixed volume discrepancy, dispersion, and related problems";

Abstract. It will be an introductory type lecture. I'll begin with the classical concepts of numerical integration and discrepancy. Then, I'll proceed to the concepts of smooth discrepancy and smooth fixed volume discrepancy. Results on the smooth fixed volume discrepancy for specific sets of points (Fibonacci, Frolov) will be discussed. Also, application of these results for dispersion will be discussed.

18:20 Nastya Rubtsova, "On the fixed volume discrepancy of the Korobov point sets";

Abstract. We will discuss the fixed volume discrepancy of the Korobov point sets in the unit cube. It was observed recently that this new characteristic allows us to obtain optimal rate of dispersion from numerical integration results. So we study this new version of discrepancy, which seems to be interesting by itself. Our work extends recent results by V. Temlyakov and M. Ullrich on the fixed volume discrepancy of the Fibonacci point sets.

19:00 Alexander Litvak, "On the minimal dispersion in the unit cube";

Abstract. We improve known upper bounds for the minimal dispersion of a point set in the unit cube and its inverse. Some of our bounds are sharp up to logarithmic factors. The talk is partially based on a joint work with G. Livshyts.

20:00 Boris Bukh, "Dispersion in a fixed dimension. Part 1";

Abstract. The dispersion $\mathrm{disp}(S)$ of an n-set S in $[0,1]^d$ is the volume of the largest empty axis-parallel box in $[0,1]^d$. The minimal dispersion $\mathrm{disp}(n,d)$ is the infimum of $\mathrm{disp}(S)$ among all possible S. It is known that, for fixed dimension d, $\mathrm{disp}(n,d) \sim c_d/n$ when n is large. We prove that $\Omega(d) \le c_d \le O(d^2 \log d)$. Furtheremore, the set attaining the upper bound can be generated in linear time. We use the same ideas to construct digital almost nets, which are an approximate version of (t,m,s)-nets, that hit all the dyadic boxes of proper volume not just once but approximately the expected number many times.

In part I, we shall describe most of the results, and explain the lower bounds. Part II will be primarily devoted to constructions.

21:00 Ting-Wei Chao, "Dispersion in a fixed dimension. Part 2".

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