Dyadic shift randomization in classical discrepancy theory

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Dyadic shifts $D\oplus T$ of point distributions D in the d-dimensional unit cube U^d can be considered as a randomization. Explicit formulas for the L_q-discrepancies of such randomized distributions are given in the talk in terms of Rademacher functions. Relaying on the statistical independence of Rademacher functions, Khinchin's inequalities, and other related results, we will obtain very sharp upper and lower bounds for the mean L_q-discrepancies. $0c_{d,q}(\log N)^{\frac{1}{2}(d-1)}$.

The lower bounds for the mean L_{∞}-discrepancy are also considered in the talk. It will be shown that for an arbitrary N-point distribution D_N there exist dyadic shifts $D_N\oplus T$ such that $\L_{\infty}[D_N\oplus T]>c_d(\log N)^{\frac{1}{2}d}$.

The paper is available on the sites: http://www.pdmi.ras.ru/preprint/2014/eng-2014.html and http://arxiv.org/1409.1997/