

L_2 star, extreme and periodic discrepancy

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This talk is devoted to three notions of discrepancies with respect to the L_2 norm and a variety of test sets. The L_2 star discrepancy uses as test sets the class of axis-parallel boxes anchored in the origin, the L_2 extreme discrepancy uses arbitrary axis-parallel boxes and the L_2 periodic discrepancy uses so-called periodic intervals which range over the whole torus. All three geometrical notions of L_2 -discrepancy can be interpreted as worst-case error for quasi-Monte Carlo integration in corresponding function spaces.

We compare these notions of discrepancy, discuss some relationships and present results for typical QMC point sets such as lattice point sets and digital nets. We turn our attention also to the dependence on the dimension d and examine whether these L_2 discrepancies satisfy some tractability properties or suffer from the curse of dimensionality.

The talk is based on joint works with Josef Dick (UNSW), Aicke Hinrichs (JKU Linz) and Ralph Kritzing (JKU Linz).