Hybrid Point Sets: Diaphony and Worst-Case Integration Error

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Quasi-Monte Carlo (QMC) methods are important tools in numerical integration. For the point sets serving as the integration nodes in QMC algorithms, it is advantageous if they are evenly spread in the integration domain. A recent topic in this field of research is that of hybrid QMC point sets, which are finite or infinite sequences of points in the unit cube, the components of which stem from two or more different other QMC point sets. In this talk, we discuss recent findings on two special types of hybrid point sets, namely

- point sets based on Halton sequences and lattice points,
- and point sets based on (t, s)-sequences and lattice points.

We present results that guarantee the existence of such hybrid point sets with excellent distribution properties, where we use hybrid diaphony as a way of measuring uniformity of distribution. We also give an outlook on relations to the worst-case errors of multiple integration of functions in suitably chosen reproducing kernel Hilbert spaces.

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