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QMC Opening Workshop
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Lecture: *Lower Bounds for the Discrepancy of Point Sets and Sequences*

Speaker: Florian Puchhammer

Abstract:

QMC algorithms usually rely on a choice of “N” evenly distributed integration nodes in $[0,1)^d$. A common means to assess such an equidistributional property for a point set or sequence is the so-called discrepancy function, which compares the actual number of points to the expected number of points (assuming uniform distribution on $[0,1)^{d}$) that lie within an arbitrary axis parallel rectangle anchored at the origin. The dependence of the integration error using QMC rules on various norms of the discrepancy function is made precise within the well-known Koksma--Hlawka inequality and its variations. In many cases, such as L^{p} spaces, $1<p<\infty$, the best growth rate in terms of the number of points “N” as well as corresponding explicit constructions are known. In the classical setting $p=\infty$ sharp results are absent for $d\geq3$ already and appear to be intriguingly hard to obtain. This talk shall serve as a survey on discrepancy theory with a special emphasis on the L^{∞} setting. Furthermore, it highlights the evolution of recent techniques and presents the latest results.