

A reduced fast component-by-component construction of (polynomial) lattice points

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The (fast) component-by-component construction of lattice point sets and polynomial lattice point sets is a powerful method to obtain quadrature rules for approximating integrals over the s -dimensional unit cube.

In this talk, we present a modification of the component-by-component algorithm which yields savings of the construction cost for lattice rules and polynomial lattice rules in weighted function spaces. The idea is to reduce the size of the search space for coordinates which are associated with small weights and are therefore of less importance to the overall error compared to coordinates associated with large weights. We analyze tractability conditions of the resulting quasi-Monte Carlo rules, and show some numerical results to demonstrate the effectiveness of our method.

This talk is based on joint work with J. Dick, G. Leobacher, and F. Pillichshammer.