The generalized Halton sequence and its discrepancy in the Cantor expansion

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Abstract.

The discrepancy of a sequence is a quantitative measure of uniformity of distribution of the sequence. It compares how close the proportion of points in the sequence falling into an arbitrary set I is to proportional to the measure of the set I. In a sense, the lower the discrepancy is, the better uniformly distributed the sequence is. Perhaps the most famous example of a low-discrepancy sequence is the van der Corput sequence in the unit interval [0,1), and the Halton sequence is a generalization of the van der Corput sequence to higher dimensions $[0,1)^s$. There have been several efforts, including for example from W.M. Schmidt, K.F. Roth, H. Faure, R. Tichy, H. Niederreiter and E.I. Atanassov, to improve the estimate of discrepancy bound of the Halton sequence and to construct related low-discrepancy sequences. In this talk, we consider the Halton sequence in a generalized numeration system, called the Cantor expansion, with respect to sequences of permutations of the Cantor base. Then we shall show that this generalized Halton sequence provides a wealth of low-discrepancy sequences by giving an estimate of its discrepancy bound. To see this, we combine some tools from a variant of the Chinese remainder theorem, elementary interval property, Diophantine geometry, the signed splitting technique and the signed numeration system. This talk is a joint work with D. Marques and A. Topuzoglu.

Referências

[1] P. Lertchoosakul, D. Marques and A. Topuzoglu, *the generalized and modified Halton sequence in the Cantor expansion*, in submission

[2] A. Haddley, P. Lertchoosakul and R. Nair, *the Halton sequence and its discrepancy in the Cantor expansion*, Period. Math. Hungar., to appear

[3] E.I. Atanassov, *On the discrepancy of the Halton sequences*, Math. Balkanica (N.S.), 18(1-2):15-32, 2004