On the discrepancy of some generalized Kakutani's sequences of partitions

Maria Infusino   `m.infusino@reading.ac.uk`
University of Reading, United Kingdom
Coauthors: Michael Drmota and Maria Infusino*

Abstract

The interest in uniformly distributed (u.d.) sequences arises from various applications, mostly in the field of quasi-Monte Carlo methods. This poster presents some recent results concerning explicit techniques to introduce new classes of u.d. sequences of partitions on the unit interval as well as on fractal sets.

We provide a quantitative analysis of the distribution behaviour of a class of u.d. sequences constructed by successive $\rho-$refinements on $[0, 1]$, which are generalizations of the classical Kakutani's sequences. Therefore, we derive optimal bounds for their discrepancy, which is the classical measure of deviation of a sequence from the ideal uniform distribution.

The approach we use is based on a tree representation of the sequence of partitions which coincides with the parsing tree generated by Khodak's coding algorithm. This correspondence allows us to derive upper bounds for the discrepancy of a countable class of ρ-refinements. This result also applies to classical Kakutani's sequences giving, for the first time after more than thirty years, quantitative estimates.