Applications of a p-adic Function System to Questions of Uniform Distribution of Sequences

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We introduce a function system closely related to the dual group of p-adic integers $\mathbb{Z}_p$, p a prime, and we prove a new variant of the inequality of Erdös-Turán-Koksma. This leads to general upper bounds for discrepancy, in terms of Weyl sums relative to this function system.

In addition, we prove a variant of the Weyl criterion for the p-adic function system under consideration. The uniform distribution of the van der Corput-sequence in base p then follows as a simple consequence.

A new notion of diaphony that is related to p-adic addition by means of a pseudo-inverse of the p-adic Monna map will also be presented.

[1] P. Hᴇʟʟᴇᴋᴀʟᴇᴋ: A general discrepancy estimate based on p-adic arithmetics. To appear in *Acta Arith.*, 2009.

[2] P. Hᴇʟʟᴇᴋᴀʟᴇᴋ: A new notion of diaphony related to p-adic arithmetics. Preprint, Univ. Salzburg, 2009.