

Balancedness, natural codings, and recognisability

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Abstract : We first discuss constructions of sequences having small symbolic discrepancy and a small (letter-)balancedness constant. Such sequences were defined by Tijdeman (1980), improving on hypercubic billiard sequences. We show that the underlying dynamical system is an exchange of polytopal domains. Next, we give conditions when an S-adic language is not only balanced with respect to letters but with respect to all factors. We give a short proof of the recognisability for aperiodic points of morphisms (that can erase letters) and show eventual recognisability for aperiodic points as well as eventual representability for sequences of morphisms with finite alphabet rank. Finally, we consider Rauzy fractals and spectral properties of S-adic shifts defined by matrices that need not be unimodular, in particular for those given by generalised continued fractions. Based on joint work with Marie-Pierre Béal, Valérie Berthé, Olivier Carton, Nicolas Chevallier, Dominique Perrin, Léo Poirier, Antonio Restivo, Jörg Thuswaldner, and Reem Yassawi.