1035-42-24 **Palle E. T. Jorgensen*** (jorgen@math.uiowa.edu), Department of Mathematics, 14-MLH, University of Iowa, Iowa City, IA 52242. *Use of radix representations and solenoid in understanding geometries of wavelet sets.*

For points in d real dimensions, we introduce a geometry for general digit sets. We report on joint work with Dorin Dutkay and Gabriel Pichioroaga. Consider a positional number system where the basis for our representation is a fixed d by d matrix over Z. Our starting point is a given pair (A, D) with the matrix A assumed expansive, and D a chosen complete digit set, i.e., in bijective correspondence with the points in Z^d/AZ^d. We give an explicit geometric representation and encoding with infinite words in letters from D.

Wavelet sets are geometric structures in R^d, but R^d is naturally embedded in an associated solenoid. This implies a useful encoding of wavelet sets, and gives insight into notions of redundancy.

Our positional "number representation" is spelled out in the form of an explicit IFS-encoding of a compact solenoid S_A associated with the pair (A, D). The intricate part is played by the cycles in Z^d for the initial (A, D)-IFS. Using these cycles we are able to write down formulas for the two maps which do the encoding as well as the decoding in our positional D-representation. (Received May 22, 2007)