1035-11-1377 **Jeffrey C Lagarias*** (lagarias@umich.edu), Dept. of Mathematics, Univ. of Michigan, 530 Church Street, Ann Arbor, MI 48109-1043. *Basic Ternary Digit Sets and Associated Tilings.*

In 1982 Matula obtained results on digit sets that represent all real numbers. Here we consider the special case of ternary representations (i.e. base 3), where all such digit sets can be translated and scaled to the form $\{0, p, -q\}$ where p, q are positive integers, with $p \equiv q \equiv 1 \pmod 3$, and $gcd(p, q) = 1$. A basic digit set in one which represents all integers with finite expansions. It then also represents all real numbers with radix expansions. The simplest example of a basic digit set is $\{1, 0, -1\}$. Associated to any basic digit set is a tiling of the line, by a fundamental tile, which may have a fractal boundary. The talk describes various properties of basic digit sets and tiles. It includes some work done by an undergraduate student, Christopher Young, as part of an REU project at the University of Michigan. This addresses the question of which pairs (p, q) give basic digit sets. Matula gave an algorithm to decide if a given pair has this property. This set of such (p, q) apparently has an intricate fractal structure, which computer experiments suggest is approximately self-similar. (Received September 19, 2007)