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Weak Separation & Finite Type Property

Abstract: Consider the set of numbers K_a representable by $K_a = \{\sum_{i=1}^{\infty} \frac{b_i}{7^i} : b_i \in \{0, a, 6\}\}$ for some $a \in (0, 6)$. We easily see that $K_a \subsetneq [0, 1]$. For $a \in (1, 5)$ we see that every $x \in K_a$ has a unique representation. If $a = 1$ or $a = 5$ then almost all numbers have a unique representation. Those that do not have a unique representation have exactly two representations, and both representations are periodic. We present an example of an a such that where almost all numbers have a unique representation, and for those numbers with multiple representations, then these representations are necessarily aperiodic. This provides a partial answer to the relationship between weak separation property and convex finite type condition for iterated function systems.