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Periodicity in radix systems with base 3

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Dedicated to Professor Imre Kátai for his 85^{th} *birthday*

Abstract. In this paper, we examine the base 3 number expansions in the ring of integers with digits $\{0, a, -b\}$, $a, b \in \mathbb{N}$ and $a \equiv b \pmod 3$. Among others, we show that for arbitrary natural numbers n and k, there is a system where n has a periodic expansion with length k. We specify an infinite number of radix systems for a given valid signature.

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