On the Foundation of Infinite Sequences

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Abstract

Infinite sequences usually appear in mathematics and other STEM Öelds as a result of solving unrelated problems. There exists no procedure for generating infinite sequences that could account for all the know sequences and lead to new ones that may prove useful in mathematics and related Öelds. This paper aims to shed some light on a method that may constitute a concrete step toward achieving that. We show that an iterative method for computing the center of mass (CM) of q units of mass, placed on a unit interval [0, 1] along the x-axis, give rise to a simple procedure for expanding rational numbers less than unity in powers of $r/s < 1$, with r, s, integers larger than 0. The method is then extended to all numbers, real or complex, though the procedure for none rational numbers is more time consuming. We also show how our method provides a natural way to generalize Jacobsthal numbers. The method provides a way to generate infinite many sequences of numbers, of which many play an important role in mathematical sciences and engineering, to name few, Jacobsthal sequence, Fibonacci sequence, and Pell sequence. Moreover, our method seems to provide a unified theory for special numbers appearing in mathematics that in the past seemed to be unrelated.