

# Periodicity in Quantum Calculus

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**Abstract:** In this paper, we study the periodicity properties of functions that arise in quantum calculus, which has been emerging as an important branch of mathematics due to its various applications in physics, and other related fields. The paper has two components. First, a relationship between two existing periodicity notions is established. Second, the existence of periodic solutions of a q-Volterra integral equation, which is a general integral form of a first order q-difference equation, is obtained. At the end, some examples are provided. These examples show the effectiveness of the relationship between the two periodicity notions that is established in this paper.