

# Fundamental Theorems in Discrete Fractional Calculus Using Nabla Operator

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## ABSTRACT

Most commonly the operator nabla is used to simplify expressions for the gradient, curl, divergence and derivative. The purpose of using nabla operator is to develop the theory of discrete version of fundamental theorems of I-nabla integration. This theory has been established through  $\infty$ -order nabla-I integrable function. This theory is then applied to arrive several fundamental theorems and examples on fractional order sums in the field of discrete fractional calculus. We derive some definitions and summation formula by inverse of  $\nabla_I$ , and on fractional order nabla integration with suitable examples. We develop this discrete fractional integration for factorials, geometric functions, and the functions having discrete Taylor's series expansion.

**Keywords:** Closed form, Newton's formula, Discrete integration

