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INEQUALITIES FOR HIGHER ORDER ITERATED DIFFERENCE EQUATIONS THROUGH SYMMETRIC FUNCTIONS

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Abstract: The present research offers insight into the connections between higher-order difference equations with iterated sums and symmetric functions, as well as the resulting inequalities from these interactions. In this study, we introduce new difference inequalities of an algebraic nature that use symmetric functions to handle significant higher-order nonlinear finite difference equations with iterated sums. With the aid of these results, it will be simple to examine a collection of higher-order nonlinear finite difference equations with iterated sums. Finally, we study the boundedness, uniqueness, and continuous dependency of the solution on the initial data of a class of iterated difference equations. Furthermore, we present a numerical illustration to highlight the relevance of our findings.

Keywords and Phrases: Symmetric functions, Difference inequalities, Higher-order difference equations, Iterated sums.

2020 Mathematics Subject Classification: 26D15, 26D07, 39A22, 39A13, 39B12.

1. Introduction

Difference equations and symmetric functions are fundamental mathematical notions with distinct properties and applications. Difference equations reflect the evolution of discrete sequences, whereas symmetric functions represent the symmetry of algebraic expressions. This article investigates the relationships between