

## LYAPUNOV TYPE INEQUALITY FOR DISCRETE FRACTIONAL BOUNDARY VALUE PROBLEM

Narayan G. Abuj and Deepak B. Pachpatte\*

Applied Science Department,  
JNEC, MGM University,  
Chhatrapati Sambhajnagar - 431003, Maharashtra, INDIA

E-mail : abujng@gmail.com

\*Department of mathematics,  
Dr. Babasaheb Ambedkar Marathwada University,  
Aurangabad - 431004, Maharashtra, INDIA

E-mail : pachpatte@gmail.com

(Received: Jan. 14, 2022 Accepted: Apr. 11, 2023 Published: Apr. 30, 2023)

**Abstract:** In this paper we consider the discrete fractional boundary value problem. The Green's function and its properties are used to find maximum value of function. With the help of maximum value of the function Lyapunov type inequality is obtain for this problem.

**Keywords and Phrases:** Lyapunov type inequality, Fractional difference equation, discrete fractional boundary value problem.

**2020 Mathematics Subject Classification:** 26D15, 39A12.

### 1. Introduction

In 1907 Lyapunov [14] proved that if the boundary value problem

$$\begin{cases} y''(t) + q(t)y(t) = 0, & a < t < b, \\ y(a) = y(b) = 0, \end{cases} \quad (1.1)$$

has a nontrivial solution, where  $q(t)$  is a continuous and real valued function on  $[a, b]$ , then