

journal of  
Applied Mathematics and  
Computational Mechanics

JAM  
JCM

Open Access Journal

[About Journal](#) [Aims and scope](#) [Editorial Board](#) [For Authors](#) [Special Issues](#) [History](#) [Contact](#) [Statistics](#)

Editorial  
System

Deklaracja  
dostępności

Issues:

Search

In print

JAMCM

Vol. 23, 2024

Vol. 22, 2023

Vol. 21, 2022

Vol. 20, 2021

Vol. 19, 2020

Issue 1

Issue 2

Issue 3

Issue 4

Vol. 18, 2019

Vol. 17, 2018

Vol. 16, 2017

Vol. 15, 2016

Vol. 14, 2015

Vol. 13, 2014

Vol. 12, 2013

SRIMCS

Vol. 11, 2012

Vol. 10, 2011

Vol. 9, 2010

Vol. 8, 2009

Vol. 7, 2008

Vol. 6, 2007

Vol. 5, 2006

Vol. 4, 2005

Vol. 3, 2004

Vol. 2, 2003

Vol. 1, 2002

Article

Existence and Ulam-Hyers stability of the implicit fractional boundary value problem with  $\psi$ -Caputo fractional derivative

Hanan A. Wahash, Mohammed S. Abdo, Satish K. Panchal

Journal of Applied Mathematics and Computational Mechanics

Year 2020, Volume 19, Issue 1, Pages 89-101

DOI: 10.17512/jamcm.2020.1.08



Download  
Full Text



Export  
citation

JAM  
JCM

Journal of Applied Mathematics and Computational Mechanics 2020, 19(1), 89-101

www.amcm.pcz.pl

DOI: 10.17512/jamcm.2020.1.08

p-ISSN 2299-9965

e-ISSN 2353-0588

EXISTENCE AND ULAM-HYERS STABILITY OF THE IMPLICIT FRACTIONAL BOUNDARY VALUE PROBLEM WITH  $\psi$ -CAPUTO FRACTIONAL DERIVATIVE

Hanan A. Wahash<sup>1</sup>, Mohammed S. Abdo<sup>1,2</sup>, Satish K. Panchal<sup>3</sup>

<sup>1</sup> Research Scholar at Department of Mathematics, Dr. Babasaheb Ambedkar Marathwada University Aurangabad 431004 (M.S.), India

<sup>2</sup> Department of Mathematics, Hodeidah University Al-Hodeidah, Yemen

<sup>3</sup> Department of Mathematics, Dr. Babasaheb Ambedkar Marathwada University Aurangabad 431004 (M.S.), India  
hawahash86@gmail.com, msabdo1977@gmail.com, drpanchalsk@gmail.com

Received: 9 September 2019; Accepted: 30 January 2020

**Abstract.** In this paper, we investigate the existence, uniqueness and Ulam-Hyers stability of solutions for nonlinear implicit fractional differential equations with boundary conditions involving a  $\psi$ -Caputo fractional derivative. The obtained results for the proposed problem are proved under a new approach and minimal assumptions on the function  $f$ . The analysis is based upon the reduction of the problem considered to the equivalent integral equation, while some fixed point theorems of Banach and Schauder and generalized Gronwall inequality are employed to obtain our results for the problem at hand. Finally, the investigation is illustrated by providing a suitable example.

**MSC 2010:** 34A08, 26A33, 34A12, 47H10

**Keywords:** fractional differential equations,  $\psi$ -fractional integral and derivative, existence and Ulam-Hyers stability, fixed point theorem