South East Asian J. of Mathematics and Mathematical Sciences
Vol. 16, No. 2 (2020), pp. 41-56

ISSN (Online): 2582-0850

ISSN (Print): 0972-7752

ON EXISTENCE OF $\psi-$HILFER HYBRID FRACTIONAL DIFFERENTIAL EQUATIONS

Shabna M. S. and Ranjini M. C.

Department of Mathematics,
MES Mampad College, Malappuram, Kerala - 676542 INDIA

E-mail : shabnasaidh@gmail.com, ranjiniprasad@gmail.com

(**Received:** *Dec. 04, 2019* **Accepted:** *May. 11, 2020* **Published:** *Aug. 30, 2020)*

Abstract: In this paper we derive existence results for the solutions to the first order hybrid fractional differential equations with perturbation of first kind and second kind involving $\psi-$Hilfer fractional derivative using different fixed point theorems. Finally the result is illustrated with an example.

Keywords and Phrases: Fractional differential equation, Hybrid, Fixed point theorem, $\psi-$Hilfer fractional derivative.

2010 Mathematics Subject Classification: 26A33, 34A38, 47H10, 34A12, 34K37.

1. Introduction

For the last few decades, many researchers attracted towards the study of fractional calculus motivated by it's wide application both in pure and applied mathematics [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13]. For studying about the dynamical systems described by non linear differential and integral equations, the perturbation techniques are very useful. The perturbed differential equations are categorized into various types. Quadratic perturbations of nonlinear fractional differential equations, which is an important type of these perturbations (Hybrid Differential Equations) have achieved a great deal of interest and attention of several researchers. Dhange and Lakshmikantham [14, 15] and Dhange and Jadhav [16] discussed the existence and uniqueness theorems of the solution to the ordinary first order hybrid differential equations with perturbation of first and second kind