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3rd International Conference On Innovative Research in Sciences, Technology, Agriculture, Environment, Business Management and Humanities (STAEBM-2023)

27th April 2023

DearOmprakash Dewangan,
Assistant Professor, *Department of Mathematics, Indira Gandhi Govt. College Pandaria,Kabirdham, Hemchand Yadav University Durg, Chhattisgarh*, India

We are Pleased to inform you that your Research paper abstracttitled"**Solution for System of fractional orderWiener-Hope Dynamical System and System of Nonlinear Variational Inequality Problem**" has been accepted by ReviewCommittee of the Conference Committee for presentation and publication in the conference.

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Research Paper Oral Presentation / Contribution Certificate

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Authored by Omprakash Dewangan

in two days International Conference held in NIT, Srinagar, Jammu and Kashmir, India.

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Track No.________________(See Brochure for Track No.)

Solution for System of fractional order Wiener-Hope Dynamical System and System of Nonlinear Variational Inequality Problem

Omprakash Dewangan
Assistant Professor, Department of Mathematics, Indira Gandhi Govt. College Pandaria, Kabirdham, Hemchand Yadav University Durg, Chhattisgarh, 491995, India.
E-mail: omidewangan26@gmail.com

Abstract—

The aim of this paper is to introduce a new system of Wiener - Hopf equation (SWHE) defined on a real Hilbert space. We study the system of nonlinear variational inequality problem on real Hilbert space. we consider a system of new fractional order Wiener-Hopf dynamical system (SFOWHDS) for system of nonlinear variational inequalities problem (SNVIP) using the Wiener-Hopf equations technique. Moreover, the existence of a solution to such a fractional order Wiener -Hopf dynamical system is considered and there is demonstrated a systemic solution to such a dynamical system. We show that the solution of system of fractional order Wiener-Hopf dynamical system is exist and unique . This type dynamical system is interesting to study because it can be apply in the various real world problems.

Keywords *Variational inequality problem, fractional derivative, Wiener- Hope equation,*projected dynamical system, , Lipschitz continuous mapping, non-expansive mapping,exponentially stability.

Introduction

Integer order differential and integral equations (IDEs) make up the majority of the mathematical models. Since a few decades ago, non-integer order differential equations (FDEs) have allowed for the more accurate and precise formulation of actual events.Many researchers have grown passionate in the study of fractional differential system dynamics in recent years, and many interesting and significant outcomes, which include factional-order differential systems having chaos have been reported. Recently, For the purpose of learning to use fractional calculus, Nonlinear system stability analysis has been enhanced.The use of fractional calculus to model nonlinear systems served as an inspiration, these studies used the integer-order stabilisation approach.

The direct approach of fractional Lyapunov are suggested by the author in an effort to extend our understanding of fractional calculus and system theory. The use of fractional calculus in reality is made practical and inexpensive by quicker processing and less expensive memory. [Chen, [8]]. There are various area like informatics and material, control of fractional order dynamical system . In some cases, a fractional-order controller for a non-integer order system may perform better in terms of transient response than a traditional integer-order controller. Modern calculus is the generalization of classical integer-order calculus. Important uses in the sciences of mechanics, viscoelasticity, signal processing,economics, optimization, oceanography, bacteria that randomly move through fractal materials in search of food,neurons modelling, chaotic systems and others as well. It is significant to highlight that fractional differential systems can be used to explain a wide range of physical phenomenathat include memory and inherited characteristics. For more read, we go to references [9]-[12].

In 2014, Zeng at.al. [14] studies at a class of global non-integer order projective dynamical systems and demonstrating the existence and originality of this kind of system's solution. With regard to these dynamical systems, it is possible to establish whether the equilibrium point exists and with the suitable conditions, its α-exponential stability.

Stampacchia initially proposed the variational inequality problem in 1964 [1], whose definition is as below:

Let C be a non-empty subset of Hilbert space H which is closed and convex and let consider nonlinear mapping T

NOTICE
Presentation
Introduction
Fixed Point Problem
We denote the set of fixed point of T by $Fix(T)$. It is well know results that variational inequality problem(VIP) (1) is equals to the following fixed point problem:
find x^* in C such that $x^* = P_C(I - \mu T)x^*$. (2)
where P_C is metric projection from H on C, $\mu > 0$ is a constant, and I is identity mapping from H on to itself. It is well known results that if the mapping T is k- Lipschitzian and η-strongly monotone, then the operator $P_C(I - \mu T)$ is a contraction on C provided that $0 < \mu < 2\eta/k^2$.
Mr. Omprakash Dewangan (HYUD)
Presentation
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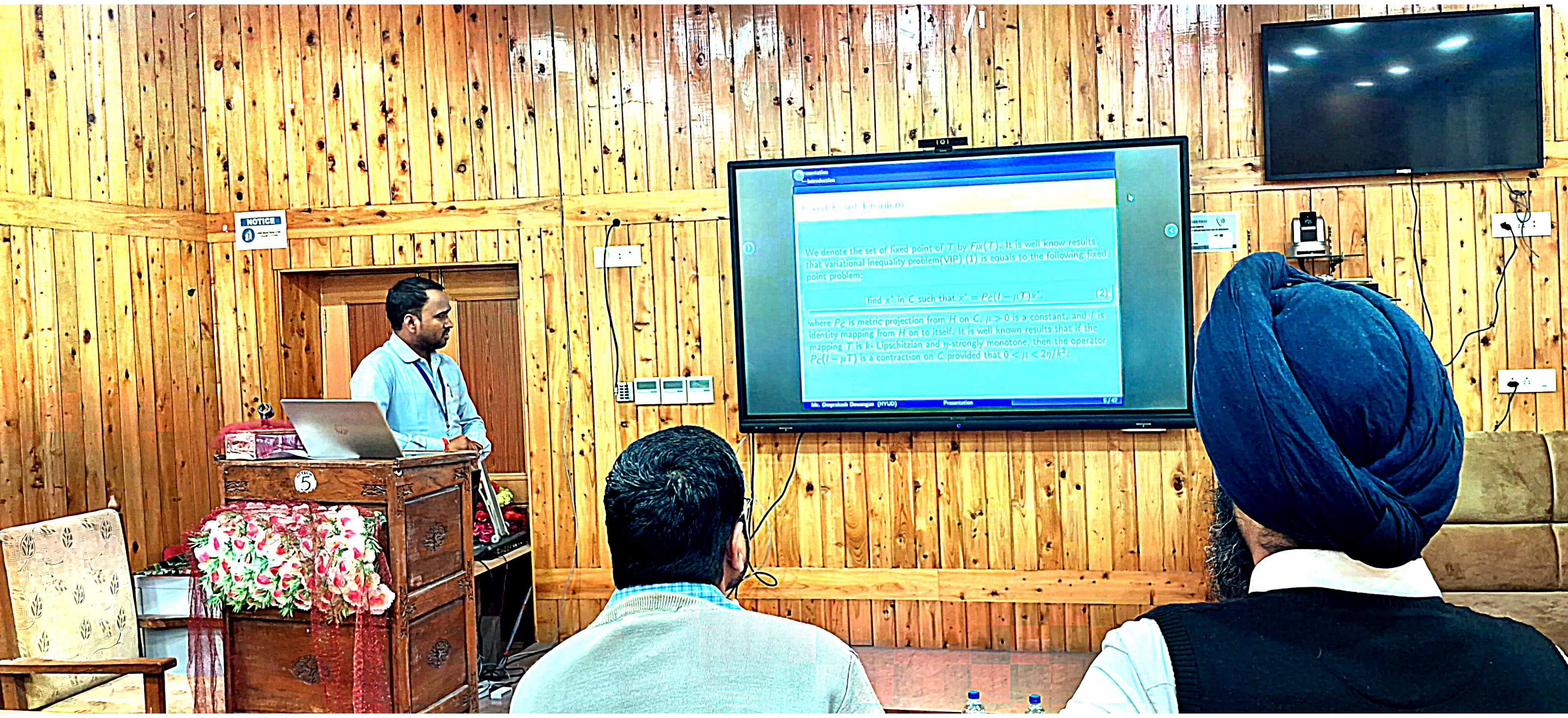
Introduction
We denote the set of fixed point of T by Fix(T). It is well know results that variational inequality problem(VIP) (1) is equals to the following fixed point problem:
find x* in C such that x* = Pc(I − μT)x*. (2)
where Pc is metric projection from H on C, μ > 0 is a constant, and I is identity mapping from H on to itself. It is well known results that if the mapping T is k- Lipschitzian and η-strongly monotone, then the operator Pc(I − μT) is a contraction on C provided that 0 < μ < 2η/k².
Presentation

Fractional order Wiener-Hopf dynamical system
We now suggest a new dynamical system:
$D_t^{\alpha} u(t) = \gamma\{P_C(u(t) - \rho Tu(t)) - \rho TP_C(u(t) - \rho Tu(t)) + \rho T(u(t)) - u(t)\},$ (8)
where $0 < \alpha < 1$ and γ is a constant, associated with Problem (1). The dynamical system of type (8) is called fractional order Wiener-Hopf dynamical system related to the Problem (1).
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Lemma[20]


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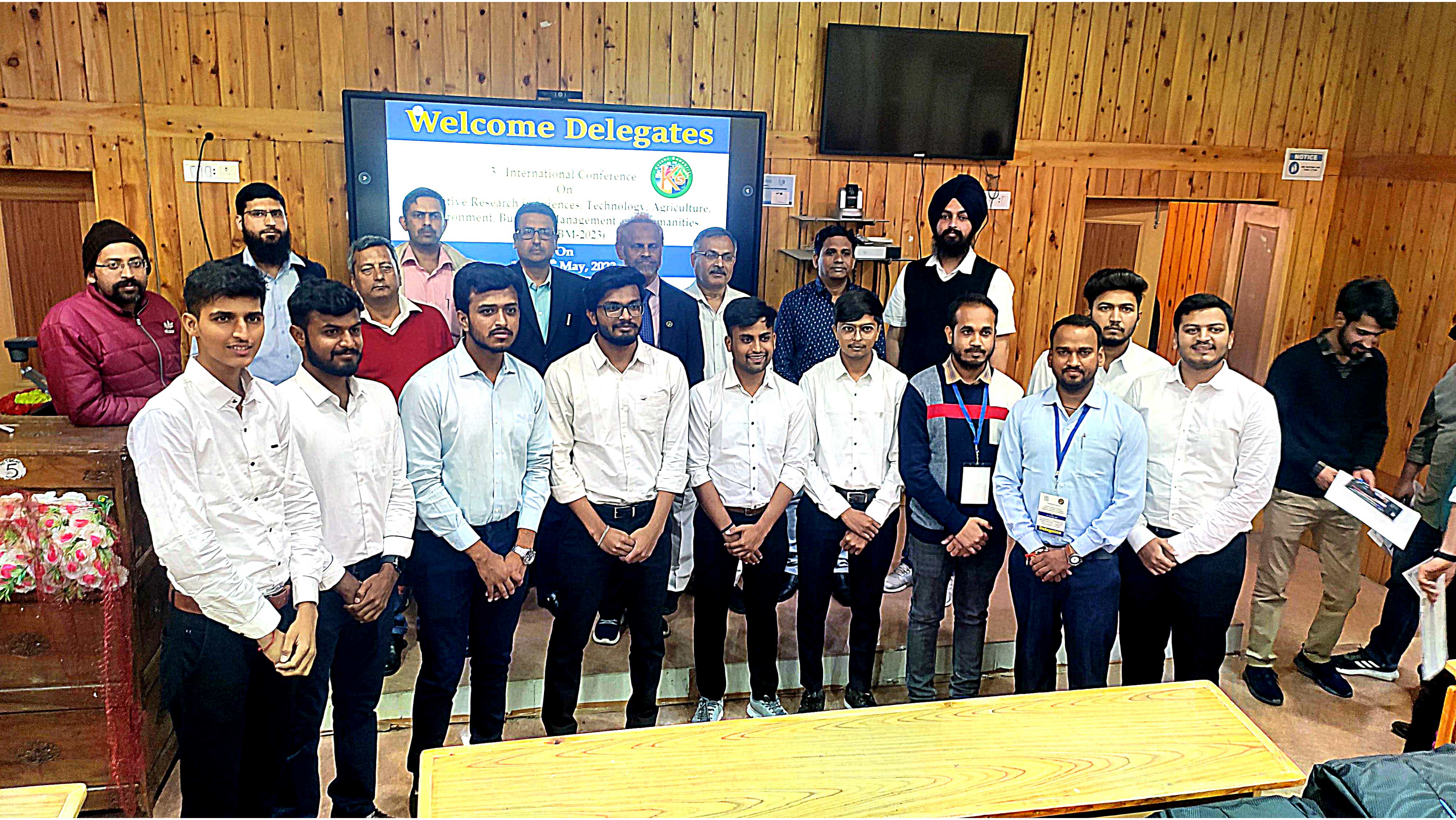
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