

# St. Philomena's College (Autonomous), Mysuru Post Graduate Studies and Research Centre Department of Mathematics

# A Report on Hands-On Session on "Nonlinear Dynamics: Solitary Waves and Its Applications" Date: 3<sup>rd</sup> April, 2024.

The hands-on session on "Nonlinear Dynamics: Solitary Waves and Its Applications" was successfully conducted at PG Department of Mathematics, St. Philomena's College, Mysore. The session aimed to provide postgraduate students with a comprehensive understanding of nonlinear dynamics, with a special focus on solitary waves and their practical applications.

# **Objectives:**

The session was designed with the following objectives in mind:

- > To introduce the fundamental concepts of nonlinear dynamics and solitary waves.
- To familiarize participants with the mathematical techniques used in the analysis of solitary wave phenomena.
- > To explore real-world applications of solitary waves in various scientific disciplines.
- > To provide hands-on experience through interactive discussions.
- > To give insights to possible research publications.

### **Outlines of the Session:**

### 1. Introduction to Nonlinear Dynamics and Solitary Waves:

Prof. R. Rangarajan chaired and gave insights on the basics of nonlinear dynamics, highlighting the emergence and characteristics of solitary waves in nonlinear systems.





### 2. Mathematical Modelling of Solitary Waves:

This discussion provided an overview of the mathematical principles underlying the modelling of solitary waves. Prof. Rangarajan pointed out few techniques involved to describe solitary wave propagation.

#### 3. Perturbation Methods and Cnoidal Wave Methods for Studying Solitary Waves:

Participants engaged in discussions on Perturbation methods and Cnoidal wave methods employed in the study of solitary waves. Practical examples and demonstrations were highlighted to illustrate the application of these methods.

#### 4. Interaction:

In this interactive session, students had the opportunity to apply their knowledge by engaging in hands-on activities. They utilized computational tools to simulate and analyze solitary wave phenomena under different conditions. Later, Prof. R. Rangarajan gave insights to the students - Alvin George and Bhagyashree N. Nayak for possible research publications in the field of nonlinear dynamics.

### **Conclusion:**

The hands-on session on "Nonlinear Dynamics: Solitary Waves and Its Applications" was a resounding success, achieving its objectives of providing students with a deeper understanding of nonlinear dynamics and its applications. The interactive discussions and valuable insights upheld the purpose of conducting academic events to facilitate the students for possible research publication in reputed journals. We extend our gratitude to Prof. R. Rangarajan for his valuable contributions and to the students for their active participation and enthusiasm.

#### Acknowledgment:

We extend our sincere gratitude to our Management and the PG Director of St. Philomena's College, Mysore, for their invaluable support in organizing the session on "Nonlinear Dynamics: Solitary Waves and Its Applications." Their guidance and assistance were instrumental in making the event a success. We deeply appreciate their commitment to academic excellence and their ongoing efforts to promote interdisciplinary learning initiatives.