Lecture Series on

NONLINEAR DELAY DIFFERENTIAL EQUATIONS

Lecture 1: Bifurcation, Chaos and Other Dynamical Structures in Nonlinear Time Delay Systems

Lecture 2: Synchronisation in Nonlinear Time Delay Systems

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Abstract

Lecture I : Bifurcations, Chaos and Other Dynamical Structures in Nonlinear Time Delay Systems

After briefly reviewing the general nature of nonlinear time delay systems, I will consider a basic model, namely the Mackey-Glass time-delay system. After establishing the fixed points and their linear stability, I will briefly point out the nature of bifurcations and chaos one encounters in this system as a prototypical example. Then I will introduce the notion of amplitude death in the case of a nonlinear system with delay feedback and its implications.

Lecture II: Synchronization in Nonlinear Time Delay Systems

In my second talk, I will introduce the notion of complete synchronization of chaos in coupled nonlinear time-delay systems and the analysis of stability using Krasovskii-Lyapunov theory. Transition from anticipatory to lag synchronization via complete synchronization will be discussed. I also hope to discuss the notion of chimera states in coupled time-delay systems.

Ref.: Dynamics of Nonlinear Time-Delay Systems, M. Lakshmanan and D. V. Senthilkumar, Springer (2010)

Date : May 12th and 13th, 2022
Time: 11:00 AM
Venue: Seminar Hall-1
Join Zoom Meeting:
http://surl.li/bwbdo
Meeting ID: 977 8784 4833
Passcode: ahZS8m

Short Biography: Muthusamy Lakshmanan (born 25 March 1946) is an Indian theoretical physicist currently working as Professor of Eminence at the Department of Nonlinear Dynamics of Bharathidasan University. Presently he is the DST-SERB National Science Chair awarded by Science and Engineering Research Board, Department of Science and Technology. He has held several research fellowships which included Raja Rammanna fellowship of Department of Atomic Energy, Alexander von Humboldt fellowship, Japan Society for the Promotion of Science fellowship, Royal Society Nuffield Foundation fellowship, and NASI-Senior Scientist Platinum Jubilee Fellowship. In the year 2021, on August 15, he was conferred with Dr. A. P. J Abdul Kalam Award by the Government of Tamil Nadu.

Known for his research on nonlinear dynamics and for the development of Murali-Lakshmanan-Chua (MLC) Circuit, Lakshmanan is an elected fellow of all three major Indian science academies – Indian Academy of Sciences, Indian National Science Academy and National Academy of Sciences, India – as well as of The World Academy of Sciences and the Royal Swedish Academy of Sciences. The Council of Scientific and Industrial Research, the apex agency of the Government of India for scientific research, awarded him the Shanti Swarup Bhatnagar Prize for Science and Technology, one of the highest Indian science awards, for his contributions to physical sciences in 1989.

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