

Report on the Workshop “Nonlinear Dynamics & its Applications”

In the on-going process of motivating the young, talented, post-graduate students and teachers of Physics, the Department of Physics, AVVM Sri Pushpam College (Autonomous), Poondi, Thanjavur, Tamilnadu, in association with Indian Academy of Sciences, Bangalore and Centre for Nonlinear Dynamics, Bharathidasan University, Tiruchirappalli, has organized a three day Lecture Workshop on “Nonlinear Dynamics & its Applications” from 9th to 11th October, 2003.

About 59 (45 PG students and 14 teachers) outstation participants, mostly from 18 colleges affiliated to Bharathidasan University, Tiruchirappalli and 5 institutions of other Universities of Tamilnadu (from Chennai to Tirunelveli) have participated in the Workshop. In addition, 69 P.G. students (30 girls and 39 boys) and 12 teachers of our institution have also participated, making the total number of participants to be 140.

While inaugurating the above mentioned workshop, the Chief Guest of the function, Prof. M. Lakshmanan (Fellow, INSA), Head, Department of Physics & Centre for Nonlinear dynamics, Bharathidasan University, Tiruchirappalli, delivered the key-note address and stressed the participants to know about the abundant avenues in Physics to explore and make use of them in their career development. He further explained the growth of theoretical physics in recent past, which led to technological advancements. In addition, he briefed the on-going activities of Indian Academy of Sciences to the participants. Dr. T.K. Krishnamurthy, Principal

of the host institution, delivered the presidential address. He spoke on the importance of acquiring and up-dating the knowledge and in-turn its reflection on progressive avenues of Science, Arts and Social sciences. Dr. P. Philominathan, Local Convener of the workshop, welcomed the gathering and highlighted the objectives of the workshop. Dr. R. Kaliaperumal, Dean of Sciences of the host institution, presented the inaugural address. He introduced the concept of 'Nonlinear Dynamics' with some historical evidences and stressed the participants to be aware of the importance of this frontier area in Physics and its applications.

After a short break for tea, the first session of the lecture programme began with the talk of Prof. M. Lakshmanan. He introduced a number of notions in nonlinear dynamics and explained the basic concepts of nonlinear systems, chaos and solitons. Based on his talk and by keeping the lectures of Prof. M. Lakshmanan as basis, Dr. S. Rajasekar of Manonmaniam Sundaranar University, Tirunelveli, continued his lecture on 'fixed-point analysis of simple linear and nonlinear systems'. In the afternoon, the complete theory of Solitons (Solitary waves, Soliton, K-dV equation, MK-dV equation, Inverse Scattering transformation, etc.) was taught by Prof. M. Daniel of Centre for Nonlinear Dynamics, Bharathidasan University, Tiruchirappalli.

On the second day (10th October 2003), the session started with a lecture on 'Local stability analysis and application to population models' by Prof. M.S. Sriram, of Madras University, Chennai. Followed by his lecture, Dr. S. Parthasarathy of Regional Engineering college, Tiruchirappalli, has made the participants to understand the dynamics of the two prototype systems, that is, logistic map and Duffing oscillator.

As an attempt to make the participants aware of applications of nonlinear dynamics, few lectures were also arranged and as a result of which, Dr. Neelima Gupte, from IIT, Chennai spoke on 'Fractals and Multi-fractals'. Followed by her talk, Dr. K. Murali of Anna University,

presented the potential applications of nonlinear dynamics in the field of consumer electronics and communications. Dr. S.Rajasekar of M.S.University, on linear and nonlinear oscillators, delivered the last talk of the second day.

On third day (11th October 2003), the morning session comprising of two lectures was completed handled by Dr. K. P.N. Murthy, Scientist H, Indira Gandhi Centre for Atomic Research, Kalpakkam. His lectures were highly inspiring and motivating for the participants. Then, a complete demonstration of the dynamical behaviour of certain nonlinear systems (discussed during lectures) using LCD projector was carried out by Dr. P. Philominathan (Local Convener) and Dr. A. Venkatesan of N.M.College, Puthanampatti, Tiruchirappalli. Following this, Dr. P. Muruganandam of Centre for Nonlinear Dynamics, Bharathidasan University delivered a lecture on 'Nonlinearity and Bose-Einstein Condensation'.

The activities of the lecture programme came to an end with a Feedback session. Prof. Ishaq Ahamed of Jamal Mohamed College, Tiruchirappalli, appreciated the organizers for bringing a handful of experts together to introduce the topic in a remote, rural college. Prof. S.Ramasubramanian of Rajah Serfoji Government College, Thanjavur shared his experience during the workshop and appreciated the way in which the topics of the workshop were selected as it fortunately covered the existing syllabus on nonlinear dynamics in the Post-graduate (physics) curriculum. A girl participant, Ms. Catherine showed her concern for not giving a bit more importance to the basics of Fractals and multifractals.

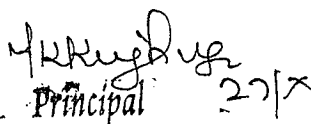
A formal valedictory function was arranged in the College Auditorium. Dr. K.P.N. Murthy delivered the valedictory address and distributed the certificates to the participants. The local convener, Dr. P. Philominathan proposed a vote of thanks(a copy of the programme is enclosed).

A wide media converge of the workshop was also initiated. The three-day activities were reported in the engagements column of the daily "THE HINDU". Local TV's (AMN TV and KARAN TV) broadcasted the inaugural and valedictory functions and local dailies reported the activities of the workshop.

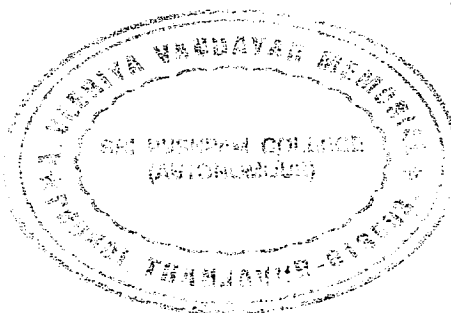
On the whole, it seems the very purpose of the three-day lecture program was realized with fullest satisfaction.


Local Convener

Dr. P. PHILOMINATHAN, Ph.D.,
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Principal 27/7

A. Veerya Vandayar Memorial
Sri Pushpam College (Autonomous)
POONDI, Thanjavur - Dt.



LIST OF INVITED SPEAKERS

- Prof. M. Lakshmanan,
Head, Centre for Nonlinear Dynamics &
Department of Physics,
Bharathidasan University, Tiruchirapalli.
- Prof. V. Balakrishnan,
Department of Physics,
Indian Institute of Technology, Guindy,
Chennai.
- Dr. K.P.N. Murthi,
Materials Science Division,
Indira Gandhi Centre for Atomic Research,
Kalpakkam, Chennai.
- Dr. Neelima Gupte,
Department of Physics,
Indian Institute of Technology,
Chennai.
- Prof. M.S. Sriram,
Department of Theoretical Physics,
Madras University,
Chennai.
- Dr. M. Daniel,
Centre for Nonlinear Dynamics,
Bharathidasan University,
Tiruchirapalli.
- Dr. S. Rajasekar,
Department of Physics,
M.S. University,
Tirunelveli.

- Dr. S. Parthasarathy,
Department of Physics,
National Institute of Technology,
(Formerly REC),
Tiruchirapalli.
- Dr. K. Murali,
Department of Physics,
Anna University,
Chennai.
- Dr.A. Venkatesan,
Department of Physics,
NM College,
Puthampatti.
- Dr. P. Muruganandam,
Scientist,
Centre for Nonlinear Dynamics,
Bharathidasan University,
Tiruchirapalli.
- Dr. P. Philominathan,
Reader,
Department of Physics,
A.V.V.M. SPC, Poondi,
Thanjavur dt.

PROGRAMME

9.10.2003, Thursday

8.30 – 9.15 a.m.	Registration
9.15 – 10.15 a.m.	Inaugural function
10.15 – 10.30 a.m.	Tea Break
10.30 – 11.45 a.m.	<i>Introduction to nonlinear dynamical systems</i> Prof. M. Lakshmanan , CNLD, Tiruchirapalli.
11.45 – 1.00 p.m.	<i>Stability Analysis</i> Dr. S. Rajasekar , M.S. University, Tirunelveli.
1.00 – 1.45 p.m.	Lunch Break
1.45 – 3.00 p.m.	<i>Theory of Solitons</i> Prof. M. Daniel , CNLD, Tiruchirapalli.
3.00 – 3.15 p.m.	Tea Break
3.15 – 4.30 p.m.	<i>Theory of solitons</i> Prof. M. Daniel , CNLD, Tiruchirapalli.

10.10.2003, Friday

9.00 – 10.15 a.m.	<i>Local stability analysis and application to population models</i> Prof. M.S. Sriram , Madras University, Chennai
10.15 – 10.30 a.m.	Tea Break
10.30 – 11.45 a.m.	<i>Logistic map and Duffing Oscillator</i> Dr. S. Parthasarathy , NIT (R.E.C.), Tiruchirapalli.
11.45 – 1.00 p.m.	<i>Fractals and multifractals</i> Dr. Neelima Gupte , IIT, Chennai.
1.00 – 1.45 p.m.	Lunch Break
1.45 – 3.00 p.m.	<i>Linear and nonlinear oscillators</i> Dr. S. Rajasekar , M.S. University, Tirunelveli.
3.00 – 3.15 p.m.	Tea Break
3.15 – 4.30 p.m.	<i>Nonlinear Electronics – Chaotic Computations</i> Dr. R. Murali , Anna University, Chennai.

11.10.2003, Saturday

9.00 – 10.15 a.m.	<i>Chaos and its characterization</i> Dr. KPN. Murthy , Indra Gandhi Centre for Atomic Research, Kalpakkam
10.15 – 10.30 a.m.	Tea Break
10.30 – 11.45 a.m.	<i>Chaos and its characterization</i> Dr. KPN. Murthy , Indra Gandhi Centre for Atomic Research, Kalpakkam
11.45 – 1.00 p.m.	<i>Computational Methods and Demonstration</i> Dr. A. Venkatesan , NMC, Tiruchirapalli / Dr. P. Philominathan , A.V.V.M. S.P.C., Thanjavur.
1.00 – 1.45 p.m.	Lunch Break
1.45 – 3.00 p.m.	<i>Nonlinearity in Bose – Einstein Condensation</i> Dr. P. Muruganandam , CNLD, Tiruchirapalli.
3.00 – 3.30 p.m.	Feed back from participants.
3.30 – 3.45 p.m.	Tea Break
3.45 – 4.45 p.m.	Valedictory function

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- Prof. M. Lakshmanan, CNLD, Bharathidasan University, Tiruchirapalli.
- Prof. V. Balakrishnan, IIT, Chennai.
- Dr. K.P.N. Murthi, IGCAR, Kalpakkam.
- Dr. Neelima Gupte, IIT, Chennai.
- Prof. M.S. Sriram, Madras University, Chennai.
- Dr. M. Daniel, CNLD, Bharathidasan University, Tiruchirapalli.
- Dr. S. Rajasekar, M.S. University, Tirunelveli.
- Dr. S. Parthasarathy, REC, Tiruchirapalli.
- Dr. K. Murali, Anna University, Chennai.
- Dr.A. Venkatesan; NM College, Puthampatti.
- Dr. P. Muruganandam, CNLD, Bharathidasan University, Tiruchirapalli.
- Dr. P. Philominathan, A.V.V.M. SPC, Poondi, Thanjavur dt.