

7Science Academies' Lecture Workshop

“Theory of Equations”

Venue: Shivaji College, Raja Garden, Delhi –110027

Date: 16-17 October, 2014

Organizers:

1. Prof. Ajit Iqbal Singh (Convener), Indian Statistical Institute, Delhi.
2. Dr. Vandana (Co-ordinator), Shivaji College, Delhi.

Resource Persons:

1. Prof. Kapil H. Paranjape, Indian Institute of Science Education and Research, Mohali
2. Prof. Nikhil Srivastava, Microsoft, Bangalore
3. Prof. B. Sury, Indian Statistical Institute, Bangalore
4. Prof. Maneesh Thakur, Indian Statistical Institute, Delhi

Brief Description of the Workshop:

The Science Academies Lecture Workshop on “Theory of Equations” was organized by the Department of Mathematics, Shivaji College, University of Delhi from October 16-17, 2014. The Lecture Workshop was supported fully by the three National Science Academies: Indian Academy of Sciences, Bangalore, Indian National Science Academy, Delhi and The National Academy of Sciences, Allahabad, India. The short informal inauguration was held at 9.15 am on 16 October, 2014. Prof. Ajay Kumar, Dean Research (P.S. & M.S.), Head, Department of Mathematics, Delhi University, was the chief guest of the function. It is because of the kind co-operation and support of the event convener Prof. Ajit Iqbal Singh, our Principal Dr. Shashi Nijhawan, the event co-ordinator Dr. Vandana, our whole Mathematics Department that the college was able to organize such a successful workshop for the benefit of the students.

Schedule of the Lecture Workshop

16 October, 2014

Time	Topic	Resource Person
8:30-9:15	Registration	
9:15-9:30	Inauguration	
9:30 – 11:00	Talk on Interlacing families of Polynomials -I	Prof. Nikhil Srivastava
11:00 – 11:30	Tea/Coffee	
11:30 – 1:00	Talk on Galois Theory: Results via examples - I	Prof. Maneesh Thakur
1:00 – 2:00	Lunch	
2:00 – 3:30	Talk on Galois Theory	Prof. B. Sury
3:30 – 3:45	Tea/Coffee	
3:45 – 5:15	Talk on Approximate Solutions- I	Prof. Kapil Paranjape

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Time	Topic	Resource Person
9:00 – 10:30	Talk on Kummer theory	Prof. B. Sury
10:30 – 11:00	Tea/ Coffee	
11:00 – 12:30	Talk on Approximate Solutions- II	Prof. Kapil Paranjape
12:30 – 1:30	Lunch	
1:30 – 3:00	Talk on Interlacing families of Polynomials -I	Prof. Nikhil Srivastava
3:00 – 3:15	Tea/ Coffee	
3:15 – 4:45	Talk on Galois Theory: Results via examples -II	Prof. Maneesh Thakur
4:45-5:15	General Discussion	

Participation:

The two-day event was attended by 120 students of various colleges of Delhi University and 30 teachers of Shivaji College, University of Delhi. The students mostly came from Cluster Innovation Centre at Delhi University, Deendayal Upadhyaya College, ISI Delhi, Keshav Mahavidyalaya, Mata Sundri College, Rajdhani College and the host Shivaji College.

The details of lectures are as follows:

The workshop started with a lecture by Prof. Nikhil Srivastava on “Interlacing families of polynomials”. He delivered two lectures and main problem that he covered was - given two polynomials p and q with real roots, when does their sum $p+q$ have real roots? He also discussed its connections to other areas such as linear algebra and graph theory, giving several examples.

Prof. Kapil H. Paranjape delivered the talks on “Approximate Solutions”. The problem of “how equations can be solved by approximation” was emphasized in his talk. High-School Method, Bisection Method, Newton-Raphson-Hensel Method, Chakravala and Continued Fractions which give "best approximations" were discussed.

Prof. B. Sury enlightened the participants by giving a few tantalizing insights on Kummer theory. Kummer theory is an integral part of Galois theory which is the pathway to higher developments like the so-called abelian class field theory. The interesting applications of it were observed and discussed with the students.

Professor Maneesh Thakur provided the participants with two beautiful Lectures on “Galois Theory: Results via examples-I and II”. He started from a very basic level introducing Ring Theory and continued up to the Galois Theory.

The workshop concluded with a General discussion moderated by all invited speakers. The speakers and the audience shared their personal experiences on the beauty of Mathematics in Real world. The participants found general discussions illuminating and interesting interaction took place throughout the session.

All the talks were informative and useful for the audience. The workshop ended with the vote of thanks to the speakers and participants by Dr. Vandana.



