

Workshop on Algebra and Number Theory

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The department of Mathematical Sciences, Tezpur University organized a workshop on Algebra and Number Theory during December 22-26, 2010. The workshop was mainly sponsored by the National Board for Higher Mathematics (NBHM), Department of Atomic Energy, Govt. of India. Department of Science and Technology (DST), Govt. of India also funded the travel of a few young Indian mathematicians. Sixty five students, BSc 3rd year, MSc, and PhD scholars from different parts of India participated in the workshop. The participants were mostly from the colleges and universities of North East. There were ten participants from institutes outside the North East, namely, University of Hyderabad, UMDE, Mumbai, TIFR-CAM, Bangalore, Burdawan University, University of Madras, Institute for Mathematics and Applications, Bhubaneswar. In fact, more than 100 students from outside North East applied for the workshop.

Recent developments in Algebra and Number Theory were presented by a selected group of experts in a way accessible to B. Sc and M. Sc. students. Dr. Anupam Saikia of IIT Guwahati delivered the first lecture of the workshop. In his two talks, he explained the importance of Number Theory in modern mathematics by introducing certain conjectures in Number Theory. He introduced Elliptic curves over the field of rational numbers and showed its connection to the famous congruent number problem and the Birch & Swinnerton-Dyer Conjecture. The Birch & Swinnerton-Dyer Conjecture which is commonly known as BSD Conjecture is the 7th Millennium Prize Problems of Clay Mathematics Institute. BSD Conjecture relates two objects coming from two completely different areas of mathematics: one is algebraic and the other is analytic. Professor Carlo Gasbarri from University of Strasbourg, France delivered a talk on abc-conjecture. The conjecture is stated in terms of three positive integers, a , b and c (whence comes the name), which have no common factor and satisfy $a + b = c$. If d denotes the product of the distinct prime factors of abc , the conjecture essentially states that d is rarely much smaller than c . Prof. Gasbarri also discussed the recent developments and related mathematics towards finding a solution of the abc-conjecture.

Dr. Ashish Kumar Srivastava from Saint Louis University, USA delivered two talks on the rings generated by units. He introduced n -good rings and discussed many open problems. Dr. Ritumoni Sarma from IIT Delhi gave two lectures on certain basic concepts in Algebra. He introduced groups, modules, and representations. Dr. Amala Bhave from JNU, New Delhi delivered two lectures on the famous Fermat's Last Theorem (FLT). She introduced FLT and talked about a few interesting history about this theorem. She also introduced the Taniyama-Weil conjecture which was proved by Professor Andrew Wiles in 1995. She explained how Taniyama-Weil conjecture actually gives a solution to the Fermat's Last Theorem. Dr. Ashish Kumar Das from NEHU, Shillong gave a talk on the mathematics software GAP. He showed how GAP can be used to solve certain problems in Algebra and Number Theory. Mr. Prem Prakash Pandey, research scholar at Institute for Mathematical Sciences (IMSc), Chennai delivered two lectures about the Catalan's Conjecture. The conjecture is due to Catalan in 1844. Recently in 2002, Prof. Preda V. Mihăilescu gave a proof of Catalan's Conjecture. The speaker Mr. Pandey gave an idea about the proof of Prof. Preda V. Mihăilescu. Finally he discussed certain generalizations of Catalan's

Conjecture to small number fields. Finally, Dr. Rajat Kanti Nath, Post doctoral fellow of Harish Chandra Institute (HRI), Allahabad gave a talk on commutativity measures of finite groups. He explained how commutativity measures are related to characters of finite groups.

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