ATM Workshop in Group Theory
May 16-21, 2011

Indian Institute of Science Education and Research
Mohali

1.1 Objective of the Workshop

A three-week advanced instructional school (AIS) on theory of groups was held at IITB Mumbai during May 10-29, 2010. The focus of the school was on combinatorial and geometric group theory. The ATM Workshop at IISER Mohali was intended as a sequel to the Mumbai AIS. The main theme of the workshop was:

1. Gromov's theorem on growth of groups.
2. The theory of Braid Groups.

Apart from these we planned guest lectures on related areas.

1.2 Speakers

The following speakers gave lectures on the main theme of the workshop:

1. Professor Valeiry Bardakov (Sobolev Institute of Mathematics, Novosibirsk, Russia)
2. Dr. Krishnendu Gongopadhyay (Indian Institute of Science Education and Research, Mohali)
3. Dr. Amit Kulshrestha (Indian Institute of Science Education and Research, Mohali)
4. Professor Kapil Hari Paranjape (Indian Institute of Science Education and Research, Mohali)
5. Professor Inder Bir S. Passi (Panjab University, Chandigarh and Indian Institute of Science Education and Research, Mohali)
6. Professor Andrey Vesnin (Sobolev Institute of Mathematics, Novosibirsk, Russia)

The following guest speakers also gave their talks:

1. Professor N.S.N. Sastry (Indian Statistical Institute, Bangalore)
2. Dr. Shripad M. Garge (Indian Institute of Technology Bombay, Mumbai)
3. Professor Siddhartha Gadgil (Indian Institute of Science, Bangalore)
4. Professor Parameswaran Sankaran (Institute of Mathematical Sciennces, Chennai)

1.3 Participants

In response to the call for participation in the workshop 49 candidates had applied. Based on the merit of the candidates a committee consisting of Professor Sudesh Kaur Khanduja, Professor Kapil Hari Paranjape, Dr. Krishnendu Gongopadhyay and the two conveners shortlisted 31 candidates and invited them to IISER Mohali to attend the workshop. Some of these participants had already attended the AIS at IITB, Mumbai. Of the selected participants 27 responded in affirmative and eventually 22 could manage to make it to the workshop.

1.4 Schedule

A copy of the schedule of the programme is attached.

1.5 Lectures

Speaker-wise details of the lectures are as follows:

1. **Professor Valeiry Bardakov**
   Professor Bardakov gave a series of six lectures on the topic *Groups in Topology and Geometry.* Main objects of his lectures were braid groups. These groups are closely related to some fascinating geometric objects like knots, links and homeomorphisms of surfaces. Professor Bardakov in his talk explored the connection of braid groups with links and knots.

2. **Dr. Krishnendu Gongopadhyay**
   Dr. Gongopadhyay spoke on the recent work of Shalom annd Tao on finitery version on Gromov's theorem. Title of his series of 2 lectures was *Shalom-Tao's proof of Gromov's Theorem.*

3. **Dr. Amit Kulshrestha**
   Dr. Kulshrestha spoke on *Kleiner's proof of Gromov's Theorem.* In his 2 lectures he discussed the recent analytical proof of Bruce Kleiner which uses harmonic maps on graphs.

4. **Professor Kapil Hari Paranjape**
   The title of the talk by Professor Paranjape was *Braid Groups.*

5. **Professor Inder Bir S. Pasi**
   The title of Professor Passi's talk was *Geometric Group Theory : An introduction.* The purpose of his 3 lectuers was to make participants aware of the basic results in Geometric Group Theory and Gromov's theorem on growth of groups.

6. **Professor Andrey Vesnin**
   Three lectures by Professor Vesnin were devoted to various aspects of Gromov's theorem as well as more general topics. Title of these lectures was *Gromov's Theorem on Polynomial Growth.* He talked about the concept of the growth function for various geometric and algebraic objects such as Riemannian manifolds and gave an explicit formula for the growth function for plane hyperbolic Coxeter groups. He also gave a proof of the Gromov theorem.

7. **Professor N.S.N. Sastry**
   Professor Sastry gave two guest lecture on *Coxeter groups: associated geometric structures and geometric representations.*

8. **Dr. Shripad M. Garge**
   Dr. Garge gave a guest lecture on *Complex reflection groups, braid groups and representations of finite reductive groups.*

9. **Professor Siddhartha Gadgil**
   Professor Gadgil gave a guest lecture on *The Goldman bracket and intersection numbers.*

10. **Professor Parameswaran Sankaran**
    Professor Sankaran gave a guest lecture on *Groups of intermediate growth.*

1.6 Feedback

At the end of the workshop a feedback was taken from the participants. From the responses it seemed that the participants found the programme useful and motivating. A blank copy of the feedback form is attached.