CIMPA Research School Final Report

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Title of the school : Functional Analysis and Partial Differential Equations

Date: July 16-28, 2017

Location: Khovd city, Mongolia

I. Summary

General presentation of the event with an emphasis on achievement of goals.

The CIMPA Research School "Functional Analysis and Partial Differential Equations" was held during July 16-28, 2017 at the Khovd University in Khovd city. It was organized by Professor Carole Rosier, University of the Littoral Opal Coast in France and Professor Sarantuya Tsedendamba, Professor Team "Differential Equations in Ecology" in the School of Applied Sciences at the Mongolian University of Science and Technology (MUST).

The school was focused on certain recent progress of mathematical analysis and numerical computations related to the partial differential equations, namely to material sciences for engineering science. It is very actual interest and concerns particularly the engineering faculties and students of the Mongolian Universities and overseas participants from Vietnam, Cambodia, South Korea, Pakistan, Austria and Philippines.

The opening speech is addressed by the Vice Governor of the Khovd city, Prof. Dr. Christian Mauduit from CIMPA and local organizers from the Khovd University and the Mongolian University of Science and Technology.

Research in the solvability of partial differential equations (PDE's) leads us to a much wider scope. In the realization that alternative methods can be used for proving the existence and uniqueness of solutions of linear and nonlinear PDE's, a new research area in Applied Mathematics was introduced. The theory of Sobolev spaces was developed, which turned out to be a suitable setting in which to apply ideas of functional analysis to glean information concerning PDE's. But this research area is not developed well in Mongolia and there are many Ph.D (also post-Doc) students (large number of them are women) in our country are still facing issues concerning functional analysis. This is the main reason why we are keen on organizing the school in this research area.

We hope that the school will establish collaboration in the research as well as help promoting exchanges between mathematicians in Mongolia and experts from the research school participating countries and support women in Mathematics in Mongolia to develop their mathematical and research skills by precondition that women play an active part in higher education in Mongolia

II. Scientific content

List here the final list of courses and talks with names of lecturers.

1. Mathematical analysis of models issuing from physical, biological and environmental problems, Prof. Dr. Carole Rosier, University of the Littoral Opal Coast , France
2. Theory and numerical simulation of phase transformations in solids, Prof.Dr. Hans-Dieter Alber, University of Technology Darmstadt, Germany
3. PDE's in a unified Hilbert space setting, Prof.Dr. Rainer Picard, University of Technology Dresden, Germany
4. Analysis of Singular BVPs in ODEs, Prof.Dr. Ewa B. Weinmueller, University of Technology Vienna, Austria
5. On C^1, C^2, and weak type - (1,1) estimates for linear elliptic operators, Prof.Dr. Seick Kim, Yonsei University, South Korea
6. A quasilinear differential inclusion for viscous and rate-independent damage systems in non-smooth domains, Prof. Dr.Dorothee Knees, University of Kassel, Germany
7. Asymptotic Issues for Some Partial Differential Equations, Prof. Dr. Michel Chipot , University of Zurich, Switzerland
8. Asymptotic Behavior Of Solutions To Nonlinear Schrödinger Equations Linking Mathematical Theories With Optical Fiber Engineering, Prof. Dr. Naoyasu Kita, Kumamoto University, Japan
9. Regularity Theory For Nonlinear Degenerate And Singular Parabolic Systems And Its Application To Geometric Flows The P-Harmonic Maps And The P-Harmonic Flows, Prof. Dr. Masashi Misawa, Prof. Dr. Naoyasu Kita, Kumamoto University, Japan

III. Participants

List here all participants, including local participants, foreign participants and CIMPA participants.

LIST OF PARTICIPANTS

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IV. Financial Report

Provide here the list of all grants received for the organization of your school. Then give the detail about expenses made with CIMPA funding.

The school received funding from the following institutions:

CIMPA   2900 Euro (money was transferred from CIMPA to the MUST)

                                    +Hotel, travel costs of 8   foreign students and Prof. Picard

IMU   1500 Euro (money was transferred from IMU center in Berlin)

University of the Littoral Opal Coast, France

University of Marseille, France

TU Darmstadt

TU Vienna + EURASIAPACIFIC UNINET

University of Kassel, Germany

University of Zurich

Yonsei University, South Korea

Kumamoto University, Japan

MUST   12,263 Mio MNT

Khovd University   2 Mio MNT

Note: The travel and lodging expenses of the invited lecturers from Germany, France, Switzerland, Japan and Korea were covered by their institutions.

Expenditure of funds:

The funds from CIMPA have been used to pay for the following:

- The travel and living expenses of 8 international students
- The travel expenses of students by bus to Khovd city and back to Ulaanbaatar (4415300 MNT)
- The breakfast, lunch and dinner cost during the school in Khovd (6600000 MNT)

The funds from IMU have been used to support the following:

- Farewell reception
- Materials and office supplies
- Travel costs to country side

The funds from the universities TU Darmstadt, University of Kassel, University of Zurich, Kumamoto University, Yonsei University

- Travel and accommodation cost of the invited speakers

The funds from MUST:

- Material and office supplies
- Documents
- Part of the meals for local participants
- Part of the dinners for foreign lecturers and students
- Transportation
- Conference map
- Gifts for speakers and foreign students
- Sightseeing
- Food and accommodation on country site camp
- Theater and museum tickets
- others

V. Pictures

Please include pictures.