RANDOM MATRIX TECHNIQUES IN QUANTUM INFORMATION THEORY (RMTQIT)

Goal of the project
The field of Quantum Information Theory (QIT) attracted lately the interest of scientific community due to the its ambitious goals meant to create new technologic systems (quantum computers) and new more secured methods to transmit the information. Nowadays, QIT is a multi-faceted field, with large connections in the subfields of Mathematics, such as Functional Analysis, Operator Theory, Linear Algebra, Probability Theory. The project RMTQIT purposes to give answers to open questions from QIT, using techniques from random matrix theory.

Short description of the project
The project RMTQIT focuses on a systematic exploration of theoretical questions in QIT about random quantum states and random quantum channels. These problems have attracted the attention lately in a very naturally connection to fundamental issues of QIT theory, such as entanglement theory and classical (or quantum) capacities for channels.

Project implemented by
1. The Department of Mathematics, Politehnica University of Timisoara.
2. Laboratoire de Physique Théorique de Toulouse, Université Paul Sabatier Toulouse III, France.

Implementation period
01.03.2013 - 29.02.2016

Main activities
In the last year within the project RMTQIT it took place interesting activities meant to complete the scientific tasks purposed as well as to extend and attract new collaborators:

- First of all, it would like to mention that we welcomed at Timisoara for short visits some of our collaborators: Dr Ion Nechita, Dr. David Reeb, from Zentrum Mathematik, Technische Universität München, Dr. Kim Dang, from Department of Mathematics Yale University and Prof. Dr. Antonino Messina, from University Palermo, Italy.
- Dr. David Reeb presented the research seminar “Extending Quantum Channels”, on 16 July 2014 at Department of Mathematics, UPT.
- The results of our research activity were presented to scientific community with several occasions:
  - in May at University of Munchen, where dr M.A. Jivulescu presented the talk “On the reduction criterion for random quantum states”, at the 25th edition of the Conference on Operator Theory, Timisoara, where dr. Nicolae Lupa presented the talk “Eigenvalue distribution of the reduced Wishart matrices and applications in quantum information theory”.

Results

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Research Team
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