ACADEMY OF DISCRETE MATHEMATICS AND APPLICATIONS

ADMA COLLOQUIUM LECTURE SERIES (ONLINE)

ABOUT ADMA

The Academy of Discrete Mathematics and Applications (ADMA) is a registered professional body functioning with the aim of promoting active and quality research in Discrete Mathematics and allied subjects. Established in 2005, it has been successfully disseminating front-line research culture among the discrete mathematicians in India.

TENTH LECTURE

TITLE: **SPECTRAL MOORE THEOREMS FOR GRAPHS AND HYPERGRAPHS**

Speaker: **Prof. Sebastian Cioaba, University of Delaware, USA**

Date: **29th MARCH, 2025 (SATURDAY)**

TIME: **07:30PM TO 08:30PM (IST)**

Registration Link: https://forms.gle/vXFcarpdtsVkKJgRA

Registration deadline is 27th March, 2025 04:00pm (IST).

NOTE: E - certificate will be issued to only those participants who are members of ADMA. For membership see www.adma.co.in

ABOUT SPEAKER

Sebastian Cioaba is a Professor in the Department of Mathematical Sciences at the University of Delaware. His research interests include spectral graph theory, algebraic combinatorics, and their connections and applications to other areas of mathematics and science.

After completing undergraduate studies in mathematics and computer science at the University of Bucharest in Romania, he obtained a Ph.D. in mathematics from Queen's University in Canada in 2005. Following postdoctoral positions at the University of California and the University of Toronto, he began his position at the University of Delaware in 2009. He has authored two books:

- A Bridge to Advanced Mathematics: From Natural to Complex Numbers, American Mathematical Society, 2023 (with Werner Linde)
- A First Course in Graph Theory and Combinatorics, Springer, 2nd edition, 2022 (with Ram Murty)

He also serves on the editorial boards of Discrete Mathematics, Linear Algebra and Its Applications, and the Electronic Journal of Linear Algebra.
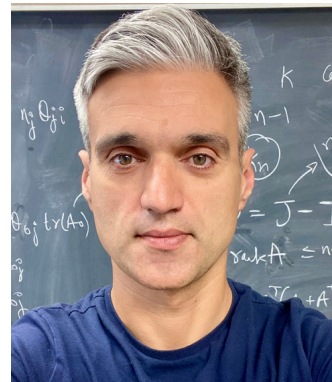
Prof. Sebastian Cioaba,
University of Delaware, USA

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Spectral Moore Theorems for Graphs and Hypergraphs

Prof. Sebastian Cioaba,
University of Delaware, USA

ABSTRACT

The spectrum of a graph is closely related to many graph parameters. In particular, the spectral gap of a regular graph which is the difference between its valency and second eigenvalue, is widely seen an algebraic measure of connectivity and plays a key role in the theory of expander and Ramanujan graphs. In this talk, I will give an overview of recent work studying the maximum order of a regular graph (bipartite graph or hypergraph) of given valency whose second largest eigenvalue is at most a given value. This problem can be seen as a spectral Moore problem and has close connections to Alon-Boppana theorems for graphs and hypergraphs and with the usual Moore or degree-diameter problem.