

APPLIED MATHEMATICS COLLOQUIUM

OPERATOR-VALUED SEMICIRCULAR ELEMENTS: AT THE INTERSECTION OF COMBINATORICS, RANDOM MATRIX THEORY, AND COMPLEX ANALYSIS

ROLAND SPEICHER
Queen's University

ABSTRACT:

Free probability theory provides concepts and tools for the treatment of many random matrix models in the limit that the size of the matrix tends to infinity. In particular, Gaussian random matrices, with independent and normal entries, are described by semicircular elements; the understanding of the latter is intimately connected with the combinatorics of non-crossing pairings.

It seems that more general Gaussian random matrices, where one allows correlations between the entries, cannot be treated nicely within free probability theory. However, it turns out that they fit well into the frame of a more general, 'operator-valued', free probability theory, and can be described by operator-valued semicircular elements. For the understanding of those, the combinatorics of non-crossing pairings becomes even more prominent.

In my talk, I will explain these connections and also point out how the understanding of operator-valued semicircular elements is related to solving special quadratic matrix equations under some positivity constraint.

MONDAY, MAY 14, 2007

4:30 PM

Building 2, Room 105

*Refreshments at 4:00 PM in Building 4, Room 174
(Math Majors Lounge)*

Applied Math Colloquium: <http://www-math.mit.edu/amc/spring07>

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Massachusetts Institute of Technology
Department of Mathematics
Cambridge, MA 02139