SIMION STOILOW INSTITUTE OF MATHEMATICS OF THE ROMANIAN ACADEMY

Monthly conference:

Superconvergence in free probability

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Wednesday, June 28, 2023, 12:00h

IMAR, *Miron Nicolescu* amphitheater

Abstract: The classical central limit theorem (CLT) shows that the distribution functions of properly normalized iid (independent and identically distributed) random variables converge uniformly to the distribution function of a standard Gaussian. Even when the distributions of the variables in question are absolutely continuous, one cannot generally conclude that the central limit process yields a convergent sequence of densities. D. Voiculescu and I found out (long ago) that one does obtain uniform convergence of densities in the free analog of the CLT, a phenomenon which (along with other supplementary properties of the converge process) we called "superconvergence". The same phenomenon was soon discovered by F. Benaych-Georges for the free Poisson process. Recent work (joint with C. W. Ho, J. C. Wang, and P. Zhong) extends superconvergence to arbitrary limit theorems in free probability theory. I will try to explain how this result follows from fairly elementary complex analysis. (Stronger results can be proved for identically distributed summands.)