1038-60-200   **Van H. Vu*** (`vanvu@math.rutgers.edu`), Department of Mathematics, Rutgers, 110 Frelinghuysen Road, Piscataway, NJ 08854. *Random matrices: The Circular Law.*

Let ξ be a complex random variable with mean zero and variance 1 and N_n be a random matrix of order n with entries being i.i.d. copies of ξ. The following well-known conjecture has been open since the 1950's:

   Circular law conjecture: The emperical spectral distribution of $n^{-1/2}N_n$ converges to the uniform distribution μ over the unit disk as n tends to infinity.

   We provef this conjecture, with strong convergence, under the slightly stronger assumption that the $(2+\eta)$th-moment of ξ is bounded, for any $\eta > 0$. Our method builds and improves upon earlier work of Girko, Bai, Götze-Tikhomirov, and Pan-Zhou, and also applies for sparse random matrices.

   The new key ingredient in the paper is a general result about the least singular value of random matrices, which was obtained using tools and ideas from additive combinatorics. (Joint work with T. Tao) (Received February 10, 2008)