

# SPECTRAL NORM OF RANDOM LARGE DIMENSIONAL NONCENTRAL TOEPLITZ AND HANKEL MATRICES

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ABSTRACT. Suppose  $s_n$  is the spectral norm of either the Toeplitz or the Hankel matrix whose entries come from an i.i.d. sequence of random variables with positive mean  $\mu$  and finite fourth moment. We show that  $n^{-1/2}(s_n - n\mu)$  converges to the normal distribution in either case. This behaviour is in contrast to the known result for the Wigner matrices where  $s_n - n\mu$  is itself asymptotically normal.

**Keywords.** Large dimensional random matrix, eigenvalues, Wigner matrix, Toeplitz matrix, Hankel matrix, spectral norm.

Combining the above steps, we have  $\frac{\tilde{\lambda}_n - \mu n}{\sqrt{n}} \xrightarrow{d} N(0, 4/3)$ . The second part of (B) follows easily from the above arguments.  $\square$

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