DETERMINANTS AND RANKS OF RANDOM MATRICES OVER $\mathbf{Z}_m$

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Abstract

Let $\mathbf{Z}_m$ be the ring of integers modulo m. The *m-rank* of an integer matrix is the largest order of a square submatrix whose determinant is not divisible by m. We determine the probability that a random rectangular matrix over $\mathbf{Z}_m$ has a specified m-rank and, if it is square, a specified determinant. These results were previously known only for prime m.

Comments

Only the Abstract is given here. The full paper appeared as [1]. For related work on random symmetric matrices, see [2].

References

1. R. P. Brent and B. D. McKay, "Determinants and ranks of random matrices over $\mathbf{Z}_m$", *Discrete Mathematics* 66 (1987), 35–49. MR 88h:15042. Also appeared as "Determinants and ranks (mod m) of random integer matrices", Report CMA-R25-85, CMA, ANU, August 1985, 17 pp. rpb094.
2. R. P. Brent and B. D. McKay, On determinants of random symmetric matrices over $\mathbf{Z}_m$, *Ars Combinatoria* 26A (1988), 57–64. MR 90g:05015. Also appeared as Report TR-CS-88-03, CSL, ANU, February 1988, 8 pp. rpb101.

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