



## TRACES OF MATRIX PRODUCTS\*

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**Abstract.** Given two noncommuting matrices,  $A$  and  $B$ , it is well known that  $AB$  and  $BA$  have the same trace. This extends to cyclic permutations of products of  $A$ 's and  $B$ 's. It is shown here that for  $2 \times 2$  matrices  $A$  and  $B$ , whose elements are independent random variables with standard normal distributions, the probability that  $Tr(ABAB) > Tr(A^2B^2)$  is exactly  $\frac{1}{\sqrt{2}}$ .

**Key words.** Random matrix, Trace.

**AMS subject classifications.** 15A15, 15A42.

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