

Lecture 31: law of large numbers

1 What happens if we take random variables multiply them. How does the product grow? Instead of the algebraic mean, we have to take the geometric mean

$$T_n = (X_1 X_2 \cdots X_n)^{1/n} .$$

Is there any way that we can tie this into the law of large numbers?

2 What happens if we take random matrices and multiply them. How fast does the product grow? We can study

$$T_n = (X_1 X_2 \cdots X_n)$$

and the growth of the eigenvalues. This is a difficult problem and not covered by the law of large numbers. What about taking the determinant? Can we study the limit

$$\log(\det(T_n))/n?$$