

# ERDŐS-KAC THEOREM AND ITS DEVIATION PRINCIPLES

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Let  $\omega(n)$  denote the number of distinct prime divisors of  $n$ . Let  $W(m)$  be a random integer chosen uniformly from  $\{n : n \leq m, n \in \mathbb{N}\}$ . Let  $X(m)$  be  $\omega(W(m))$ . The celebrated Erdős-Kac theorem asserts that

$$\frac{X(m) - \log \log m}{\sqrt{\log \log m}} \rightarrow N(0, 1),$$

where  $N(0, 1)$  is the standard normal distribution.

In 2016, Mehrdad and Zhu studied the large and moderate deviations for the Erdős-Kac theorem. In this talk, we will give a brief introduction to the theory. Then we will discuss how to establish the large deviation principle for  $X(m)/\log \log m$ . If time allows, we will discuss some generalizations.

This is a joint work with Dr. Peng-Jie Wong.