

On Selberg's Central Limit Theorem for Dirichlet  
 $L$ -Functions

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In probability theory, the central limit theorem roughly tells us that any sequence of random variables converges to a normal distribution. In 1946, Selberg proved that  $\log |\zeta(\frac{1}{2} + it)|$  will possess a distribution approximate to the normal distribution when  $t$  is large, which is extended to a large class of  $L$ -functions by himself and is nowadays called the Selberg's central limit theorem. In 2017, Radziwiłł and Soundararajan gave a new proof of the Selberg's central limit theorem for  $\log |\zeta(\frac{1}{2} + it)|$ .

In this talk, we will discuss how to extend the method developed by Radziwiłł and Soundararajan to Dirichlet  $L$ -functions. If time permits, we will also discuss the independence property of random variables arising from the associated  $L$ -functions.