

Abstract

- **Title:** On large gaps between consecutive zeros, on the critical line, of some zeta-functions
- **Candidate:** Johan Bredberg
- **College:** Lincoln College
- **Degree:** D. Phil. in Mathematics
- **Date:** Hilary 2011

In this thesis we extend a method of Hall [30, 34] which he used to show the existence of large gaps between consecutive zeros, on the critical line, of the Riemann zeta-function $\zeta(s)$. Our modification involves introducing an “amplifier” and enables us to show the existence of gaps between consecutive zeros, on the critical line at height T , of $\zeta(s)$ of length at least $2.766 \times \frac{2\pi}{\log T}$. To handle some integral-calculations, we use the article [44] by Hughes and Young.

Also, we show that Hall’s strategy can be applied not only to $\zeta(s)$, but also to Dirichlet L -functions $L(s, \chi)$, where χ is a primitive Dirichlet character. This also enables us to use stronger integral-results, the article [14] by Conrey, Iwaniec and Soundararajan is used. An unconditional result here about large gaps between consecutive zeros, on the critical line, of some Dirichlet L -functions $L(s, \chi)$, with χ being an even primitive Dirichlet character, is found. However, we will need to use the Generalised Riemann Hypothesis to make sense of the average gap-length between such zeros. Then the gaps, whose existence we show, have a length of at least 3.54 times the average.