"Smoothed" Character Sums
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Abstract

The topic of "smoothed" character sums is very recent in mathematics. "Smoothed" character sum was defined in 2010 in a paper by Levin, Pomerance and Soundararajan and was further explored by Treviño in his PhD dissertation.

This thesis, which is a blend of number theory, abstract algebra and complex analysis, will explore and show how to construct Dirichlet character functions and both regular and "smoothed" character sums.

A Dirichlet character is a function from integers to complex numbers which has three properties: is periodic, completely multiplicative, and takes non-zero values if and only if the argument and the period are relatively prime.

In order to explore the upper bound of "smoothed" Dirichlet character sums, the mathematicians extended the widely-explored regular character sum and made it a weighted character sum by multiplying each term by a factor.

In this thesis, I will provide numerical evidence to how good the upper bound given by Levin, Pomerance and Soundararajan is. The importance of such data is evident in the case of regular character sums where the numerical evidence is in favor of the upper bound which assumes the generalized Riemann hypothesis.