Abstract
Gaps between primes

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The aim of this thesis is to give an in-depth study of Gaps between prime numbers, but to be more precise my study was more in-depth of studying only the gaps between two consecutive prime numbers. In chapter four of my thesis, I will focus on the small gap between primes , I study the prime gaps that are smaller than the average prime gap and I based my studies manly on the results and methods of Goldston-Pintz-Yildirim (The GPY sieve) in studying the k-primes tuples and small prime gaps to prove unconditionally the existence of infinitely many prime gaps that are smaller the average.

I continued to study the methods that James Maynard used in his paper to refine the GPY sieve to prove the infinite existence of bounded prime gaps between two prime consecutive numbers. With that being said, I observed the clear difference between the unconditional proof of James Maynard of the unbounded gaps to the conditional proof the GPY sieve to show the same infinite existence of bounded gaps between two consecutive primes. Lastly in chapter 5, I focused on large prime gaps between two consecutive primes and reciprocated almost the study of small prime gaps, I surveyed the method of Ford-Green-Kanyagin-Tao to show how arbirarily large the prime gap between two prime gaps can be, resonating the proof of E. Westzynthius to how infinitely many are gaps between two consecutive prime numbers.