

CHAPTER VII

The Goldbach conjecture

7.1. Introduction.

The global Riemann hypothesis and its generalisation for L-series, implies a new proof of the weak Goldbach theorem. This theorem, sometimes called Vinogradov's three prime theorem, states that every odd number greater than 5 is the sum of three primes.

7.2. The weak Goldbach theorem.

The weak Goldbach theorem was proved unconditionally by Harald Helfgott in papers in 2012 and 2013 [2He12], [2He13a], [2He13b]. However, it has been known since 1997 [DERZ97] that the generalised Riemann hypothesis implies the weak Goldbach theorem for all numbers. \square

7.3. Conclusion.

Our mathematical journey has now attained lift-off and the whole Earth lies in perspective beneath us. But this is not the end of our journey, it is the beginning. The reader is invited to continue our exploration. Mathematically the whole universe lies before us.