

**Gourav Krishna Nandi: Mathematical Sciences**

**Mentor: Russell Walker: Mathematical Sciences**

***Cantor's Theory of Fractional Dimension and Large Infinities***

The aim of the study was to analyze the works of Georg Cantor, (1845 - 1918) which reveals an elegant perspective of the foundation of mathematics. Under the guidance of professor Russ Walker, the study was conducted in different phases. The first phase initiated with the analysis of the geometrical objects in fractal dimensions. We investigated the concept of fractal dimensions and applied it to Cantor set, Cantor square and other iterated functions. Following the first phase, we studied the patterns in fractional dimension in the Koch-Sierpinski triangle. The study on Koch triangle demonstrated a relation between the length of the removed portion of a Koch triangle and its dimension. The second phase also beheld the proof of Koch triangle's uniform Cauchy continuity. The third segment focused on Cantor function. Also known as a singular function and Devil's Staircase, further study constituted the proof of its continuity. The subsequent study will be focused on Cantor's transfinite numbers and the Continuum Hypothesis. This phase will also include the analysis about the existence of transcendental numbers. The study of Cantor's work on fractal dimensions and large infinities lies at the heart of the present day advanced Mathematics. This study will help me be to build a strong foundation for advanced Mathematics that I aim to pursue in course of time.