Honors Project - Project Proposal

Shahaf Dan | Math 5 - Differential Equations

Title: Fourier's Theorem

Description: Jean-Baptiste Joseph Fourier was French mathematician who lived in the 18th and 19th centuries. He had discovered that any reasonably continuous periodic function can be expressed as the sum of a series of sine or cosine terms. Fourier's theorem is often referred to as Fourier's series. This theorem became one of the modern keys to modern science, applied in many fields. Applications of the series include electrical engineering, magnetic patterns, vibration analysis, image and sound processing, sound cancellation and isolation, econometric, quantum mechanics, and more.

In this honors project, a few remarks and questions regarding the Fourier's theorem will be answered. The project will explore the derivation and development of fourier's theorem (fourier's series) and describe the process of coming up with the theorem mathematically. In addition, the project will determine the importance of the role the theorem played in the development of modern science and technology, as well as explore and discuss its various applications in modern science, particularly in its application in the computer science and quantum mechanics fields. Furthermore, the project will discuss possible applications of the theorem and series in the near future.

In addition to a fully typed research paper with various resources to ensure accuracy and precision of information, the project shall include the derivation, differentiation and mathematical development of the theorem as developed by the French Mathematician.

Throughout the semester, I will update the instructor regarding my research process on a monthly basis, and if any questions arise or any help is needed, I shall bring it up to the instructor's attention. The time line includes two main milestones: both literal and mathematical research to be done by the middle of the semester (March 25th) and the final product to be prepared for submission towards the end of the semester (May 7th).