Abstract

A general approach to problems in mathematical analysis is the use of approximate representations of functions, such as Taylor series. When regarding approximate representations of functions of a periodic nature, in the study we call Fourier analysis, we attempt representations of functions as a sum of trigonometric functions. In this thesis we present one of the problems encountered in Fourier analysis with regard to the pointwise convergence of Fourier series. We prove Kahane's Theorem on divergence of Fourier series of continuous functions on large sets by a topological approach. To do so, we introduce the fundamental tools of topology and review Baire's Category Theorem and the Kuratowski-Ulam Theorem, and the fundamental notions of Fourier analysis such as Fourier series, the Dirichlet Kernel and the Convolution of functions.