

Abstract

Operators in Hilbert space have properties which are useful in the study of mathematical abstract areas such as approximation theory, Banach Fixed point theory, the spectral theory as well as Quantum Mechanics. Schrödinger equation is a fundamental entity with many applications in Quantum Mechanics. This equation was initially derived by applying the knowledge of electromagnetic wave function and Einstein theory of relativity. Later, it was derived by applying the knowledge of Newtonian mechanics. It was also derived by extending the wave equation for classical fields to photons and simplified using approximations consistent with generalized non-zero rest mass. However, from the existing literature no study has been done on deriving Schrödinger equation using properties of Hilbert space operators. In this study, Hilbert space operators that include unitary operators, self adjoint operators and compact operators, norms of linear operators, Hilbert Schmidt operator, normal operators together with Lebesgue Integral, Neumann Integral and spectrum are used in place of the existing concepts of electromagnetic wave function, Einstein theory of relativity and approximation consistent with generalized non zero mass to derive the Schrödinger equation. The derivation of Schrödinger equation and its application using Hilbert space operators enhances a better understanding of the concept of Schrödinger equation. The results of this work can further find use in quantum mechanics as well as in mathematical operator theory.