Abstract ID: P64

LINE INTEGRALS THROUGH HIGHER DEGREE TAYLOR POLYNOMIAL APPROXIMATION

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Abstract

Integration is one of the basic operation in mathematical calculus. It occurs in almost all physical situations where the variable is continuous function of one or more continuous independent variables. When the function is not continuous or if the integrand, the function which is to be integrated, is not integrable using the available techniques, we usually go for numerical techniques of integration. This means that we have to apply numerical methods in order to get an approximate solution. From the several numerical integration approaches, we proposed Line Integrals Through Higher Degree Taylor Polynomial Approximation. Main objective of our work is finding better approximation in terms of accuracy and to derive a formula for error upper bound. We performed out work on algebraic, exponential and trigonometric functions. At the end we compared our results with some of the existing approximation methods such as Midpoint rule, Simpson's rule, Trapezoidal rules and Tangent line approximation and we proved our method gives more accurate solution for those functions.

Keywords: *numerical integration, definite integral, error upper bound, Taylor polynomial*