

SECOND DEGREE TAYLOR POLYNOMIAL APPROXIMATION OF SURFACE INTEGRAL

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Numerical integration is an important mathematical tool used in wide area of Mathematics where scientific computation is required. Finding the exact solution of real world problems involve with definite double integrals is highly challengeable and indeed most of the times not necessary. To resolve these types of difficulties we use numerical approximation techniques. In the literature, there are several numerical integration approaches discussed by many mathematical researchers. In this paper we proposed an approach using Taylor polynomial of degree two. The main objective of this research is to focus on approximating a definite surface integral in order to get a better approximation solution in terms of accuracy. We implemented the proposed approach to some selected functions of algebraic, trigonometry and exponential and compared the obtained results with tangent plane approximation and Simpson's $\frac{1}{3}$ rule. It is observed that the proposed method provided more precise results compared to the tangent plane approximation and Simpson's $\frac{1}{3}$ rule.

Keywords: *Definite integral, Numerical integration, Taylor polynomial*