
AN OPTIMIZED ONE-STEP FIVE-OFFGRID HYBRID FOURTH DERIVATIVE METHODS BASED ON THE VOLTERRA INTEGRAL EQUATION OF THE SECOND KIND FOR SOLVING FOURTH ORDER INITIAL VALUE PROBLEMS

Raymond, Dominic^{1,*}, Barde, Williams²,

¹*Department of Mathematics, Federal University Wukari, Taraba State, Nigeria*

²*Department of Mathematics, Federal University Wukari, Taraba State, Nigeria*

ABSTRACT

In this article, an optimize one-step five off-grid hybrid point fourth derivative method based on the Volterra integral equation of the second kind for solving fourth Order Ordinary Differential Equations is develop, the method proposes an exponential function and power series as the basis function for a selected five hybrid points which suitably optimizes one of the off-grid points by equating the principal term of the local truncation error to zero at the second derivative while keeping other terms as free parameter and using the local truncation error to determine the approximate values of the unknown parameter, the basic propertise of the method was scrutinize and the develop method of the Volterra integral equation of the second kind is apply to work out some solve fourt order initial value problems of ordinary differential equations and from the numerical results obtained, it is observed that our new methods gives better approximation than the existing method compared.

Keywords Optimize off-grid · Local Truncation error · Volterra integral equation · exponential function

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*Corresponding Author's E-mail: raymond@fuwukari.edu.ng