13/2021

# INSPEM'S ONLINE
# WEEKLY SEMINAR

**DATE : 16 APRIL 2021 (FRIDAY) | TIME : 3.15 PM**
**MEDIUM : VIDEO CONFERENCE (ZOOM)**

*Meeting ID: 960 1464 7762*
*Passcode: 788910*

## Dr. Yusuf Dauda Jikantoro

**Department of Mathematical Science,
Ibrahim Badamasi Babangida University,
Nigeria.**

## Topic : Highly Efficient Method for Numerical Integration of Fourth Order Initial Value Problems

## ABSTRACT

In recent time, Runge-Kutta (RK) methods that integrate fourth order ordinary differential equations (ODEs) directly are proposed to address efficiency issues associated with classical Runge-Kutta methods. Although, the methods require approximation of y', y" and y'" of the solution at every step to proceed with the integration. The proposed method in this research addresses the issues of derivatives approximation while maintaining the other properties of RK methods. Algebraic order conditions of the methods are derived. Using the order conditions, a highly efficient method is presented. Absolute stability of the method is analysed and the stability region presented. Numerical experiment is conducted on some test problems. Results from the experiment show that the new method is more efficient and accurate than the existing Runge-Kutta and hybrid methods with similar number of function evaluation.

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