

ANALYSIS OF RÖSSLER ATTRACTOR BY MEANS OF RESIDUAL AND JOUBERT-GREEFF METHODS

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Abstract: In this paper, A mathematical framework of checking accuracy of numerical methods from mathematical software is been developed and investigated. Rössler attractor is used as case study as its analytical solution is non-existence. The algorithms investigated from Mathcad software includes AdamsBDF, Adams, BDF and Runge-Kutta fixed methods. The numerical solutions of each built-in algorithms are compared to well-known Joubert-Greeff method. The estimation of global and local residuals are shown. The graphical results are plotted on an interval of $0 \leq t \leq 150$.

Keywords and Phrases: Rössler attractor , MathCad software, Joubert-Greeff method , global and local residuals.

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1. Introduction

Rössler system is a system of nonlinear differential equation which was derived and studied to details by Otto Rossler in [4]. These differential equations define are continuous-time dynamical system that exhibit chaotic dynamics associated with fractal properties of the attractor. The original Rossler paper in [4] states that