New Solutions of Initial Value Problem (IVP) using Picard's Iteration

Nursyahira Atiqa Zainal Rahid[1], Suzanawati Abu Hasan[2]
[1]*syahiraatiqa99@gmail.com*
[2]*suzan540@uitm.edu.my*

ABSTRACT

A differential equation in mathematics contains the derivatives of one or more dependent variables. The equation can be classified as an ordinary or a partial differential equation, with a partial differential equation containing differentials about many independent variables. We will concentrate on an ordinary differential equation in this study. We want to find a pattern by using ordinary differential equations, for example, in biology or medical physics. Differential equations can be linear or nonlinear. Some strategies for achieving a numerical solution are Euler's, Picard's, and others. This study focuses on Picard's method. Picard's method was the first to be used to demonstrate the existence of solutions to the initial value problem for the ordinary differential equation. The advantage of Picard's method is its ability to deal with a wide range of initial conditions, as we will see in the initial value problem. Furthermore, Picard's method is a simple and straightforward approach in terms of formulas. As a result, we use Picard's method equations to simplify the analytical, calculation, and numerical solutions. Furthermore, Picard's method can provide the most approximate solution because it is an iterative method in which the numerical results become more accurate as more times are used. Picard's Iteration will be used in this study to solve initial value problem equations. The objectives also include determining Picard's Iteration solutions and studying numerical solutions to initial value problems. The numerical solutions to three ordinary differential equations used in this study will be examined.

Keywords: Picard's Iteration, Differential equation, Ordinary Differential Equation, Partial Differential Equation, Initial Value Problem, Numerical solution