



Solving Initial-Value Problem of the First-Order Differential Equation by Euler's Method using Casio fx 570EX Classwiz Scientific Calculator

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ABSTRACT

Solving numerical methods manually without using a scientific calculator or using scientific calculator traditionally without input the iterative formula into the calculator can be quite tedious and boring due to its repetitive calculations. There is a series of studies discussing the implementation of numerical methods using Excel spread sheet as well as Casio scientific calculators, such as Casio fx-570 MS scientific calculator, Casio fx-570 ES scientific calculator and Casio fx-570 ES plus scientific calculator. Even though Excel spreadsheet made the implementation of numerical methods easier to be understood by the new learner of numerical methods, but it is not portable for classrooms (teaching and learning purposes) and examination hall (evaluation purpose). All the three mentioned models of scientific calculators allow the input of iterative formula but users still need to rein put the new inputs then press CALC button to get its iterative solutions. The new model of Casio fx-570 FX classwiz scientific calculator offers a spreadsheet ability of 45 rows and 5 columns which made the implementation of the numerical methods much easier if compared to previous models. Hence, in this paper, we solved the initial-value problem (IVP) of the first-order ordinary differential equations by the Euler's method using Casio fx-570 FX classwiz scientific calculator for the classroom and examination purposes.

Keyword: IVP, ODE, Euler, Casio

INTRODUCTION

An ordinary differential equation (ODE) is a differential equation consists of the functions of only one independent variable and its normal derivatives. ODEs arise in many physical problems including engineering, physics, economics, biology and etc. The order of an ODE is determined by its highest derivatives. Hence, there are first-order, second-order and higher-order QDEs.

When the analytical solution of an ODE is not available, we have to seek its approximate solution by using numerical methods. There are several numerical methods such as the Euler's, Taylor series, midpoint, Heun, fourth-order Runge-Kutta (RK4) methods and etc to solve an IVP of the first-order ODE.

Solving numerical methods manually without using a scientific calculator or using scientific calculator traditionally without input the formula into the calculator can be quite tedious and boring due to its repetitive calculations. Hence there is a series of books discussing the implementation of numerical methods using Casio scientific calculator, such as Casio fx-570 MS scientific calculator in [1], Casio fx-570 ES scientific calculator in [2] and Casio fx-570 ES plus scientific calculator in [3].

The studies on solving numerical methods in classroom and examination situations using a calculator, focusing on nonlinear equations [4]-[5], systems of linear equations [6], interpolation [7], an approximation of integration [8], and computing of eigen values [9]-[10].