1. Introduction

1.1 Background and Context

Shooting method is a numerical method used for numerical analysis of boundary value problems by using the given boundary conditions to “shoot” an initial condition with satisfies those boundary conditions. It involves finding a solution initial condition for different initial value problems until we find the solution which also satisfies the boundary conditions of the boundary value problem. In other words, we shoot out trajectories in different directions towards a particular boundary condition until we find an initial condition that hits it. Hence, its name the shooting method.

1.2 Scope and Objectives

* To learn the numerical analyses method that is shooting method.
* Using the shooting method to solve various ODEs with the help of Euler’s Method.
* To shoot or find an initial condition for a linear and non-linear ODE which satisfies the given boundary condition.
* To shoot our predictions on the basis of the already used values.
* Comparing the solution and accuracy of Euler’s Method with that of Runge-Kutta Second Derivative method.
* Using MATLAB to make guesses for the initial conditions.

1.3 Achievements

We learned how the shooting method (a numerical analysis technique) works and how it can be used to predict an initial condition and then land on the correct initial condition verifying it with the boundary condition provided. We solved linear and non-linear ODEs with shooting method using Euler’s method as well as Runge-Kutta Method and compared the efficiency of both the methods by the amount of guess it took to solve a problem by both the methods. We also used MATLAB to find the next value to shoot so we can get close to the actual initial condition.