MA3469 - Assignment 1

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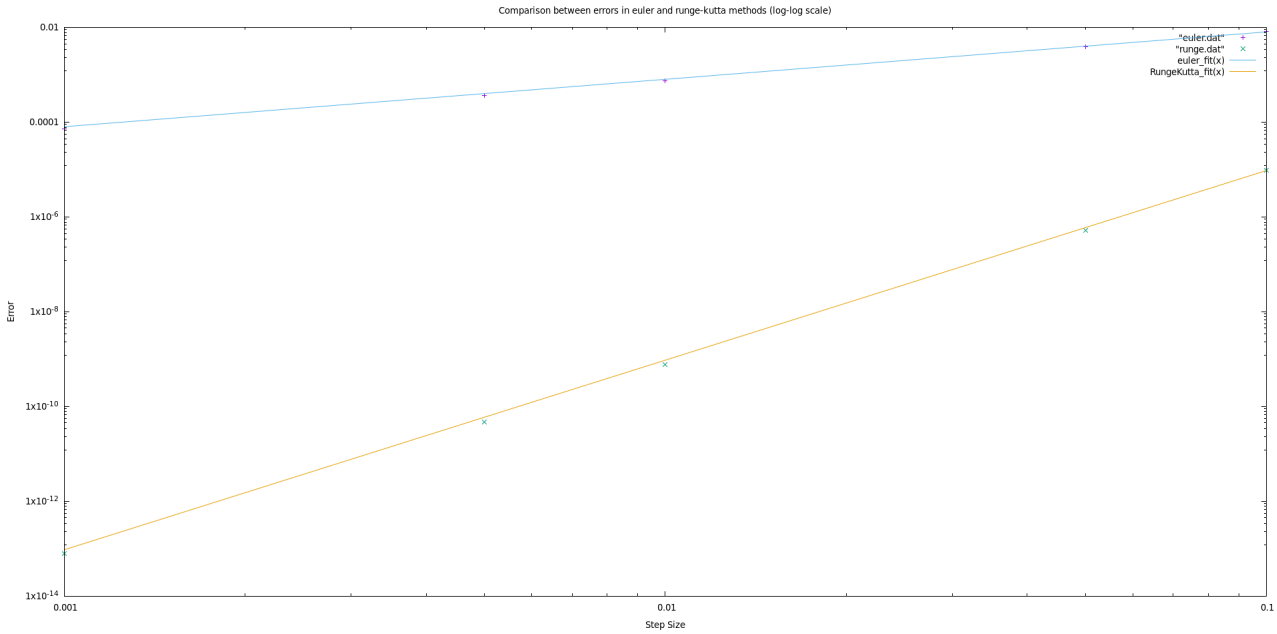
Problem 1.

Solution Below is a plot of the dependence of the error on the step size for the Euler method and the Runge-Kutta method when compared to the analytic solution.



The Euler data was fitted with a function of the form $f(x) = a \cdot x$
The Runge-Kutta data was fitted with a function of the form $f(x) = a \cdot x^4$

These fits tell us that the error in the Euler method scales linearly with the step size h and the Runge-Kutta method scales with h^4.

Problem 2.

Solution The Runge-Kutta algorithm in *rossler.cc* gives the value of $x_0(50) = 1.97347$ which to 5sf is $x_0(50) = 1.9735$ this agrees with Mathematica's solution to the problem