UCSI UNIVERSITY

FACULTY OF ENGINEERING, ARCHITECTURE AND BUILT ENVIRONMENT

SCHOOL OF ENGINEERING

FINAL YEAR PROJECT REPORT EE405/EE410
SOLVING THE LORENZ EQUATIN USING 5TH ORDER RUNGE-KUTTA METHOD

STUDENT'S NAME : MUHAMMAD SHAHBAZ RAZA
STUDENT'S ID : 1000716067
FIRST SUPERVISOR : MR. MOHD SULHI BIN AZMAN
SECOND SUPERVISOR : MR. IWAN
PROJECT'S COORDINATOR : MR RODNEY TAN HEAN GAY

JANUARY TO AUGUST 2011

ABSTRACT

The project title, "solving the Lorenz equation using 5th order Runge-kutta method" aim to provide the opportunity to study and understand the Lorenz equation and investigate the numerical method for solving the Lorenz equation.

Theoretical knowledge on the basics mathematics, linear and nonlinear ODE equation will be gain as well through this project. We solve the Lorenz equation and get the famous butterfly effect. The result of simulation depends on the parameter of Lorenz equation. Three parameters: σ, r and b. we will always assume that these parameters are positive. We take σ=10.0, and b = 8/3. These are the most used values in the study of the Lorenz equations. We will vary the parameter r over a wide range, and study how the solutions depend on r. when change the parameter r (0.1, 0. 5, 1.0, 10, 13.94, 20, 23.926, 28.00, 100).

This study provides the opportunity to understanding the mathematics and derivation and how the mathematical model related to engineering system. This project benefit have a opportunity to learn the MATLAB soft ware in the detail which is very useful in engineering system and also how to do the programming using m-file in MATLAB. Other than it is also recall the mathematics skills and deeply understanding how the mathematics is useful for the engineering system.