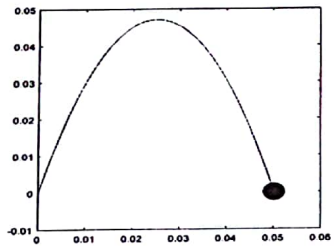
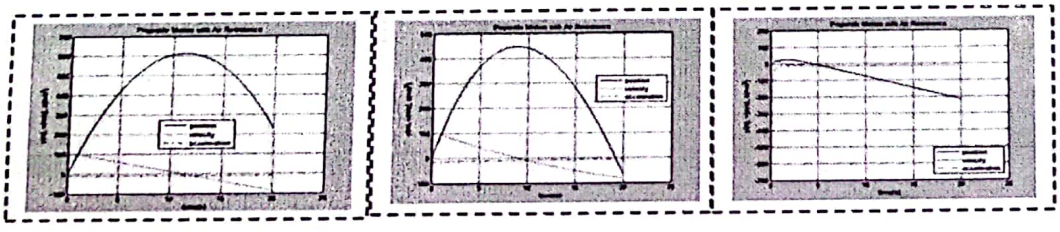
Proj 01: Developing movie of a flying projectile using Matlab and Python

The projectile motion, a branch of a complex physics and an interesting phenomenon of investigation for many centuries till today. It deals with the study of substantially below the speed of light. The advancement of the problem has come from three fields: physics, mathematics, and computation for various industry, civil, and military applications. As a physical and mathematical in nature, the focus has been given on the methods for computation, simulation and analysis of the governing equations of motion. In this project, the projectile motion with various drag forces: (a) zero drag, (b) linear drag, (c) quadratic drag are computed, simulated and analysed for predicting various trajectories profiles with three set of input parameters using MATLAB source codes.

Project Requirements

1. You should be able to discuss brief theory of projectile motion with various drag forces (at most 2 pages).
2. Your solution must be able to demonstrate calculations to solve the projectile motion with various drag forces: (a) zero drag, (b) linear drag, (c) quadratic drag with Matlab.
3. It should also compare results obtained by Matlab and Python programs.
4. You should also compare exact solutions and approximate solutions from your developed programs with respect to errors.
5. You should develop a GUI as it simplifies the utilization of these methods by providing an intuitive and interactive interface, eliminating the need for extensive programming knowledge
6. You should prepare a report to mention all requirements of the project and details of solution to problems.
7. Useful plots of projectile motion with different cases be included in the project report.





Figures similar to above will be generated by the computer code.

Proj :

Numerical solutions to partial differential equations using Python and Matlab

The numerical methods are used in many applications in science and engineering and are helpful in the use in graphing out functions and initial value problems. We will use Python and Matlab to study numerical techniques for solving some partial differential equations that arise in Engineering physics. Most of the ideas, and some of the syntax, that you learned for Matlab will transfer directly to Python. We'll work through some brief tutorials about Python at the beginning of each problem, focusing on the particular ideas that you'll need to complete that job. Hopefully, this study will make one Python experts.

Project Requirements

1. You should be able to discuss brief theory of problems which are modelled with patial differential equations (at most 2 pages).
2. Your solution must be able to use appropriate methods to solve three real world problems related to partial differential equations with Matlab and Python.
3. It should also compare results obtained by Matlab and Python programs.
4. You should also compare exact solutions and approximate solutions from your developed programs with respect to errors.
5. You should develop a GUI as it simplifies the utilization of these methods by providing an intuitive and interactive interface, eliminating the need for extensive programming knowledge
6. You should prepare a report to mention all requirements of the project and details of solution to problems.

Figures similar to following will be generated by the computer code.