UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

NUMERICAL-ANALYTICAL ALGORITHM FOR
CONSTRUCTING THE ENVELOPE OF THE
POINT MASS TRAJECTORIES IN MIDAIR

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IN THE NAME OF ALLAH, THE MOST GRACIOUS, THE MOST MERCIFUL.

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ABSTRACT

A projectile is the movement of any object over the air that worked on just by the gravity and air resistance. The motions of a projectile unfaltering by the items starting speed push edge and gravity. When any object is going through the fluid such as water or air, it will experience a backward force which is called as a 'drag force'. This project focuses on the motion of a projectiles with the air drag force is taken into account assumed to be constant proposed by Chudinov (2009). This project also includes constructing of the envelope of a family of trajectories and projectories. The aim of this research is to construct the envelope equation and by using the envelope equation, we can form a formula that can be used for the determination the maximum range of flight. A numerical integration is used to compare these approximate value with analytical values. Also, Matlab Software are used in solving the numerical integration of the differential system and maple software to generate a graph for the solution.

1 INTRODUCTION

1.1 Research Background

A projectile is the movement of any object over the air that worked on just by the gravity and air resistance. The motions of a projectile unfaltering by the items starting speed push edge and gravity.

When an object or particle is thrown with some underlying speed near the Earth's surface and moves along a curved path, it will experience a motion called as a projectile motion. A shot is move with a steady level speed in the mix of horizontal and vertical motion and falls unhibitedly under the action of gravity. In the particular, the effects of air resistance are assumed to be negligible, then the projectile will follow a parabolic curved path (Changjan & Mueanploy, 2015).

When any object is going through the fluid such as water or air, it will experience a backward force which is called as a 'drag force'. Drag force is the resistance of a fluid, the force that it applies acting opposite to the motion of an object that is moving submerge in a certain fluid.

In the geometry, an envelope of a family projectile curves in the plane is a curve that is tangent to every member of the family. Regularly, a point on the envelope can be seen as the convergence of two adjacent curves, which means the crossing points of around curves is cutoff. In this manner, this assessment can be summed up to an envelope of surfaces in space, and so on to higher dimensions.