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The Simulation of Missile Kinetics with Distance & Time Depended Speed on Moving Object Initiated from Space Attaching Vertically

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Abstract

The simulation about missile kinetic behavior is going to search the attacked moving object in this study. The speed and distance with needed time could be searched and could find some information about it. Firstly the AB value is going to increase largely when the time increases. Secondly the missile speed is going to increase from 10m/s to 750m/s while object speed enhances from o.1Km/s to 0.5Km/s that means that the AB with maximum 0.75Km will follow maximum speed 0.75Km/s accordingly. Thirdly the time is going to decrease from 6s to 0 while object speed enhances from 10m/s to 0.5Km/s. Correspondingly the attacking time will demand 1s when object speed becomes 0.5Km/s.

Keywords: Simulation; missile kinetics; distance; time; speed; movement's object; vertical attack

Introduction

The missile as an important weapon could be used in defence department. Specially in war period it can play an significant role on modern inter-country's conflict, therein the corresponding emphasis will be taken in world's main countries. The missile has been searched in advanced assembly to attack enemy's device whose meaning is significant from the strategic view. So we must search it and make it to be more aggressive continuously by engineer and scientist for planning new functions to be precision attack which can be put urgent position. In this paper its Kinematics establishment can attack a moving object like ship, flighter, missile etc. which may be establishing simulation equation to analyze its precise problem because the accurate attack may promote its effectiveness. So the research could investigate that factor to look forwards to seeking important message for us to search continuously [1-4]. Through this research the important parameters should be sought and found for making sure the demand from engineer and scientist. For the sake of making low cost weapon like missile the relevant high performance should be cultivated and developed, which has been destination of this paper in brief and concluded in here. We have found the distance and time depended speed relations from the simulating results. In short the missile or plane is able to initiate from space one point to realize the attack destination, which can be simulated here. At the same time the corresponding parameters could be regulated to finish the attack task precisely. The precision will be an important mission in attacking moving target that needs many simulation or practice to prove constantly.

Modeling for missile Kinetics

It is supposed that one object in y axis movement with v speed. We can establish the modelling with below steps for attacking the object in B point whose principle is shown as shown in Figure 1. The A point will be missile starting one while B point is able to attack placement. There q□presents angle in x-z coordinate; f□presents angle in OA and y axis; a presents OA' resolved by OA in x-y one. Here in x-y-z coordinate system A presents x-y-z coordinate system one point and A¢ presents in x-y one while A¢¢ indicates A' resolution in x axis. At last in y axis there is a moving object with v speed. The t is the passing time to hit the target object at B point. That A'B is vertical to Y axis means the missile will hit the B point object in that angle. In that diagram a lies in OA¢ and x axis, g lies in AB and A¢B. Meanwhile q is presenting OA and

AA¢, b presents OA and Y axis, f presents OA and AB. Additionally v presents the object speed.

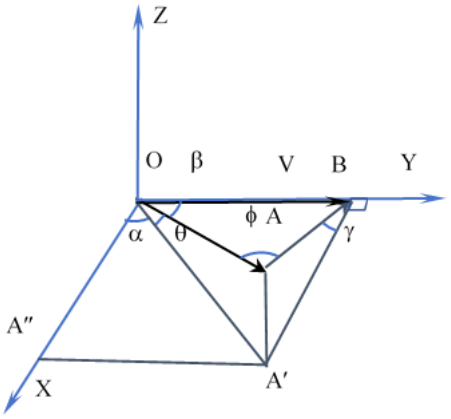

Figure 1 The missile attacked kinematic resolution diagram in x-y-z three coordinate.

In light of the Figure 1 kinematic diagram in x-y-z three coordinates,

since $\sin\gamma=z/AB$ ---(1)

And $tg(\pi/2-\alpha)=A'B/OB=\frac{\sqrt{AB^2-Z^2}}{OB}$ ---(2)

So $z=\sqrt{OB^2\left[tg(\frac{\pi}{2}-\alpha)\right]^2-AB^2}$ ---(3)

It has $AB=\frac{OBtg(\frac{\pi}{2}-\alpha)}{\sqrt{(\sin\gamma)^2+1}}$ ---(4)

That equation will become AB and OB distance one

Discussions

According to the kinematic resolution the below results could be acquired. The detail analysis will process and seek the key intrinsic connection like OB-AB, v1-v graph which can present the key data between the object aim and missile movement. So we discuss the detail comparing result as follows. As for the parameters met there the various conditions like angle a and g is about to use to process while maintaining the main parameters like above mentioned is able to adopt in this paper. So we found the below results as several conclusions.

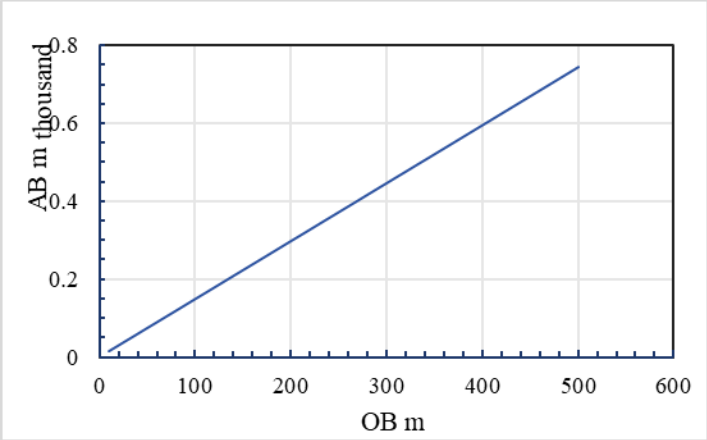

Figure 2 The relationship between AB and OB with a=30°; g=36°.

Figure 2 shows that the missile distance AB is going to enhance from 25m/s to 780m/s when the object speed raises from 10m/s to 500m/s in the course of tracking object. They are in proportion to each other under a=30°, g=36°. That missile distance AB is higher than object OB means the higher speed is needed.

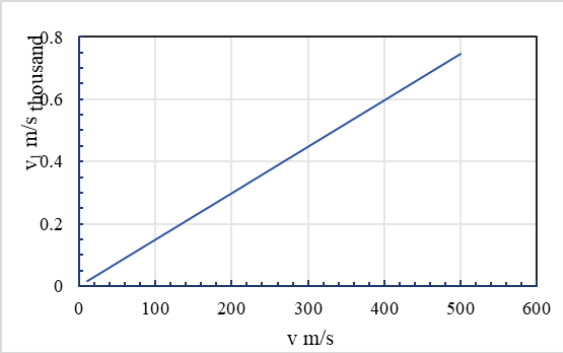

Figure 3 The relationship between missile speed v1 and object speed v with a=30°; g=36°.

Figure 3 could have shown that the v1 is going to raise from 30m/s to 750m/s while v raises from 10m/s to 500m/s accordingly. The missile speed has become less than that has a=20°. The reason is able to provide no longer distance AB but short time for missile.

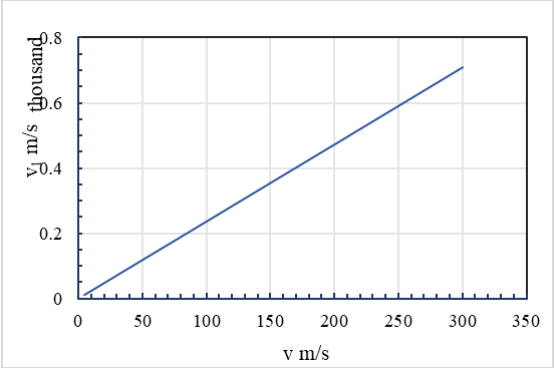

Figure 4 The relationship between missile speed v1 and object speed v with a=20°; g=36°.

Figure 4 has shown that the missile speed is able to raise from 20m/s to 720m/s when the object speed attains from 10ms/ to

300m/s accordingly. The former will be in proportion to the latter under a=20°; q=36°. That the missile speed v1 is able to indicate the higher than object speed v will mean the shorter time or more distance for it to hit is needed here. With decreasing the a the increased missile speed enables to happen correspondingly.

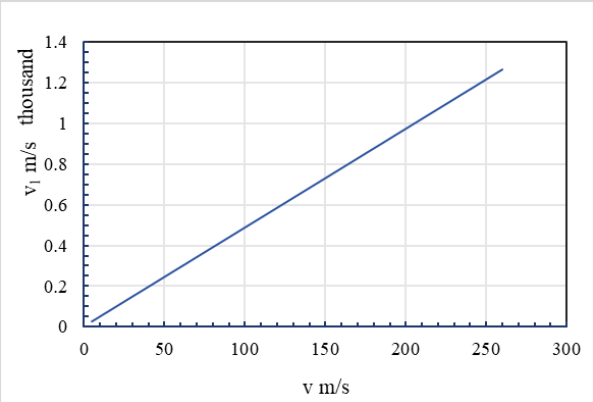

Figure 5 The relationship between missile speed v1 and object speed v with a=10°; g=36°.

Figure 5 could have shown that the v1 is going to raise from 25m/s to 850m/s while v raises from 10m/s to 260m/s accordingly. The missile speed has become bigger than that has a=20°. The reason is able to provide more distance AB for missile as it is shown in Figure 2.

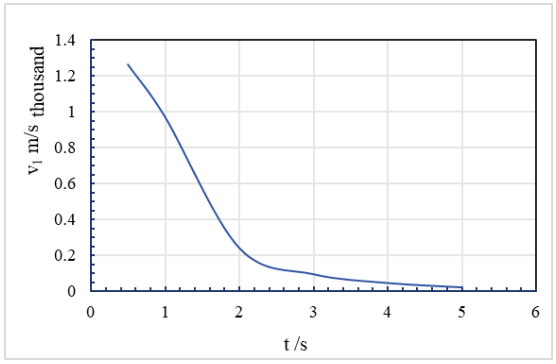

Figure 6 The relationship between missile speed v1 and object time t with a=10°; g=36°.

Figure 6 shows that missile speed v1 is able to be decreasing from 1.3Km to 50m while the moving object time enhances from o.4s to 5s respectively. It means that the high speed like 1Km/s towards the moving object will be needed in order to hit the moving object effectively when the passing time attains 1s. Another one needs to be explained if the flighter or missile has moved with 1 Mach i.e. 360m/s the distance between our flighter or missile needs 2s to initiate and complete attack which is necessary according to this study. The passing time t will be proposed with 6s under highest missile speed.

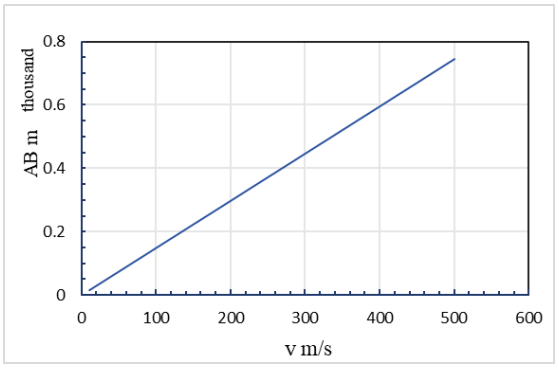

Figure 7 The relationship between missile distance and object speed with a=30°, g=36°.

Figure 7 shows that the missile distance will enhance to 0.75Km when object speed enhances to 0.5Km/s with two angles above. When the object speed arrives 1 mach the missile distance 0.5Km in light of the curve in that figure. In short the four parameters are concluded here, and find some message between them. The OB, AB distance and needed time with moving object speed changing can be solved in this study. The changing the angle can bring over data's some changes. The angles change could not process in this study so it can not known to bring over what chang

Conclusion

The OB, AB and moving time depended speed is able to be solved through this study. The four parameters can be clarified to attack a moving object. The speed and distance with time could be searched and find some information about it. Firstly the AB value is going to increase larger when the moving time increases. Secondly the AB is going to increase from 10m to 800m while object speed enhances from 0.1Km/s to 0.5Km/s that means that the AB with maximum 0.8Km will follow maximum speed 0.8Km/s accordingly. Thirdly the time is going to decrease from 5s to 0.5s while object speed enhances from 0.1Km/s to 0.5Km/s. Correspondingly the attacking time will demand from 5s to less one when object speed becomes 0.1Km/s. Hereby the simulation about missile kinematic behavior is going to search the attacked moving object in this study.

References

[1] Shousong Hu, Principle of automatic control, Science Press, 2010: 429

[2] Yuepeng Chen, Robust control and fault-tolerant control for generalized systems, Science press, 2010: 2~5

[3] Run Xu, Parameters Simulation of Missile Track Trace With Linear & Exponential Equation, Social Science learning Education Journal, 2020, August, 5(8), 284~288.

4. Run X, Parameters Simulation of Missile Track Trace with Linear Quadratic & Exponential Equation I, Social Science learning Education Journal, 2020, 5(09) September, 345-351