

Numerical analysis of dynamics and control of the searching and tracking head placed on a moving object

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Abstract – The paper presents the results of computer simulation behavior of the head while searching for and tracking the detected low-flying air target. The head is placed on a moving object such as a ground vehicle or a ship.

Keywords – dynamics and control, searching and tracking head, missile launcher.

I. INTRODUCTION

On today's battlefield are increasingly being used remotely targeted shooting modules installed on mobile land-based facilities [2], air and sea. An important element of these devices are heads for automatic search and tracking targets for destruction [1]. Currently, there is still a problem of controlling such heads under the kinematic excitations of the basis on which they are located.

II. OBTAINED RESULTS

In order to investigate the dynamics of the present head, carried out a number of simulation tests for the different states of the kinematic excitation from manoeuvring ground vehicle.

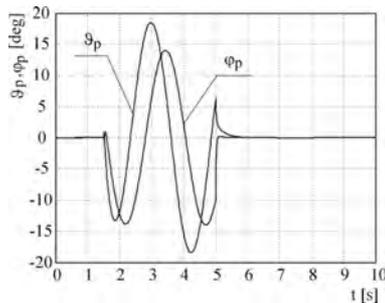


Fig. 1. Changes the inclination θ_p and roll ϕ_p angles of the platform as a function of time without stabilizing controls

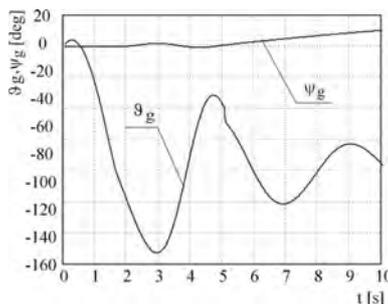


Fig. 2. Changes the inclination θ_g and deviation ψ_g angles of the head as a function of time without stabilizing controls

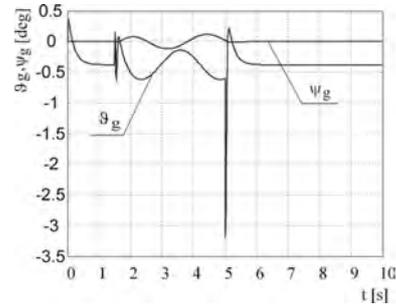


Fig. 3. Changes the inclination θ_g and deviation ψ_g angles of the head as a function of time with stabilizing controls

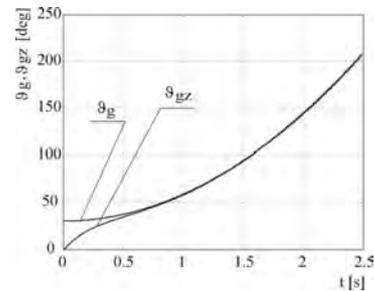


Fig. 3. . Changes the desired θ_{gz} and actual θ_g angles while tracking of target by the head

III. CONCLUSION

Fig. 1-4 presents the results of some of the studies. In the Fig. 2 clearly can be seen a highly instability of head emerging at the time of activation disturbance from the platform on which it is located (Fig. 1). The dynamics of the head significantly improves after applying stabilizing controls (Fig. 3). Tracking control, in turn, provide a stable tracking of moving point in space, irrespective of the kinematic excitations arising from the platform (Fig. 4).

REFERENCES

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