UDK 629.7.14-519.056.6(043.2)

A.Samoilenko, A.Hryhoruk
National Aviation university, Kyiv

DESIGN OF H_∞-CONTROLLER OF UAV INERTIALLY STABILIZED PLATFORMS

The important problem of stabilization of UAV payload belongs to the most important problems solved during UAV design. Usually the rigid requirements by precision are given to such process. It is impossible to satisfy these requirements without stabilization of base on which the appropriate informational-measuring devices are mounted.

The choice of the synthesis method depends essentially on features of the system operation conditions. The studied systems operate under influence of the external disturbance (wind). The problem of controller synthesis for the studied system may be solved on the base of the robust control.

The H_∞-control is one of the most widespread advanced engineering techniques. Nowadays this technique is used in order to achieve robust performance.

The statement of the robust control problem may be generalized by integration of the plant and controller as it is shown in Fig. 1.

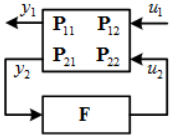

Fig. 1. Statement of the generalized robust control problem

After weighting matrix transfer functions choice the studied system may be augmented by these functions. The augmented system is shown in Fig. 2.

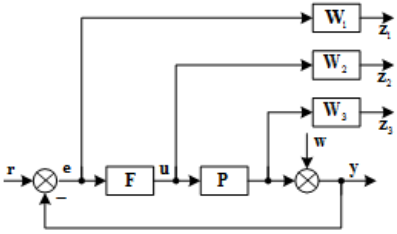

Fig. 2. The augmented transfer function of the system: z_1, z_2, z_3– additional outputs

Using the method of mixed sensitivity, the functional of the optimization problem may be represented in the form

$$T_{y1u1} \stackrel{\text{def}}{=} \begin{bmatrix} W_1 S \\ W_2 R \\ W_3 T \end{bmatrix},$$

This function defines penalties both for the sensitivity function and for the complementary sensitivity function at the same time.

Scientific supervisor
Dc of Tech Sci., professor O.A.Sushchenko