

**Application of the deflection method for the investigation of the dynamic properties of highly - manoeuvrable dynamic objects and constructing of quality non-linear regulators**

The constructing of the regulators for highly - manoeuvrable dynamic objects leads to the necessity of formulating and solving the problem of synthesis of regulators in the universal form. In order to reach the universality of the structure of the synthesis method the standard form of representation of the basic dynamic equations is being taken into account. The dynamic equations are presented as a system of equations in deviations from the given basic regime, where the summands of the Taylor's sum of the power higher than one are taken into consideration.

The task of building the optimal regulator is being solved using the modified method of analytical constructing on the basis of a quadratic quality functional.

In order to make the procedure universal, the technique of representing of nonlinear controlled objects in the matrix form has been developed. On the basis of this representation the numerical procedures of finding the solution of the ACOR problem have been developed.

During the procedure of calculating the regulator the summands of the higher powers by the changes of the phase coordinates and controls are consequently included into the equation describing the object under control. As a result, on each step of the calculations the parametric regulator is constructed. Parameters depend on the function in the quality functional and represent the quality of control. If the desired trajectory of the object under control is given, the parameters should be obtained from the conditions of the maximum control speed. Such an approach gives a possibility of complete usage of the allowed rudder deflections.