**Mathematical modelling**

**Homework**

**Task 1. Introduction. Mathematical models of flight dynamics**

**Methodical instructions**

In Lecture 1, general principles of mathematical modelling were discussed. The structure of mathematical models was described. A classification of mathematical models was given. As an example, we considered the problem of a body falling under its own weight.

The subject of Task 1 is mathematical models of flight dynamics, which are generalizations of the mathematical model of the body falling process. A description of these models is given in the Appendix of Lecture 1. In the following tasks, it is required to indicate the marked characteristics of the corresponding mathematical model, just as it was done in lecture for the model of the body falling.

**Variants**

1. For the mathematical model of the probe movement, determine the object of study, coordinate system, output parameters.
2. For the mathematical model of the probe movement, determine the state functions, causal relationships, input parameters.
3. For the mathematical model of the probe movement, determine the reason for the evolution, the conditions of the model applicability, the independent variables.
4. For the mathematical model of the probe movement, determine the cause of evolution, the object of research, the conditions of the model applicability.
5. For the mathematical model of the probe movement, determine the input parameters, causal relationships, state functions.
6. For the mathematical model of the missile flight, determine the object of study, coordinate system, output parameters.
7. For the mathematical model of the missile flight, determine the state functions, causal relationships, input parameters.
8. For the mathematical model of the missile flight, determine the reason for the evolution, the conditions of the model applicability, the independent variables.
9. For the mathematical model of the missile flight, determine the cause of evolution, the object of research, the conditions of the model applicability.
10. For the mathematical model of the missile flight, determine the input parameters, causal relationships, state functions.
11. For the mathematical model of the glider flight, determine the object of study, coordinate system, output parameters.
12. For the mathematical model of the glider flight, determine the state functions, causal relationships, input parameters.
13. For the mathematical model of the glider flight, determine the reason for the evolution, input parameters, the independent variables.
14. For the mathematical model of the glider flight, determine the cause of evolution, the object of research, output parameters.
15. For the mathematical model of the glider flight, determine the input parameters, causal relationships, state functions.