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OPTIMAL CONTROL OF A LOW-ALTITUDE FLIGHT IN THE TERRAIN-FOLLOWING MODE

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In a terrain-following flight, it is important to minimize the deviation of the aircraft altitude from a given height function. The paper describes a class of optimal controls for the pure terrain-following problem. We consider a model of a controlled flight in a vertical plane, where the control is the elevator angle. The functions of the aerodynamic moments and forces are linear in the control and continuous in all phase variables. The aircraft is regarded as a rigid body. Based on these assumptions, it is proved that an optimal control is a function taking two extreme values. The specified class of controls is used in numerical experiments. In calculations we use a model of flight at subsonic speeds in dense layers of the atmosphere. Using a specific aircraft model as an example, we compare the efficiency of two control algorithms described by a piecewise constant function and a continuous function.

Keywords: terrain-following problem, pure terrain-following problem, flight in a vertical plane, optimal control of an aircraft.

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