

ABSTRACT

The master's thesis comprises an introduction, five chapters, conclusions summarizing the entire study, and a bibliography. The thesis encompasses 90 pages of the main text, 19 illustrations, 28 tables, and 21 references, resulting in a total volume of 105 pages.

Objective and tasks of the work: The aim of the dissertation is to investigate a new three-coordinate piezoelectric gravimeter within the automated UAV control system. The main tasks of the dissertation include:

- introduction (relevance, field of application, novelty, practical value).
- general overview of automated UAV control systems.
- analytical review of gravity acceleration measurement tools.
- principle of operation, construction, application, mathematical model of the sensitive element of the automated UAV control system.
- analysis of sensitive element errors, issues related to increasing the accuracy of determining gravity acceleration measurement.
- calculations of the main parameters of the sensitive element.
- experimental laboratory studies of the sensitive element.
- computer-aided design (CAD) of the sensitive element.
- program implementation of the interaction between the sensitive element and the microcontroller (using MPU6050 and Raspberry Pi Pico).
- development of a startup project.
- conclusions.

The object of the research is the process of determining gravity acceleration using a three-coordinate piezoelectric gravimeter within the automated UAV control system.

The subject of the research is the three-coordinate piezoelectric gravimeter as part of the automated UAV control system.

Research methods: The methods underlying this work are based on the principles of the piezoelectric effect – the generation of an electric charge in a plate

made of a special material that deforms under the influence of force, including gravity acceleration.

Practical significance of the results:

- description of the operating principle of the three-coordinate piezogravimeter and its schematic diagram;

- description of the mathematical and physical foundations of its operation, including the reception and processing of the output signal;

- consideration of strategies to improve measurement accuracy.

Publications: Two theses were published for the conference "Three-coordinate Sensitive Element of the Automated Control System" and "Two-channel Piezoelectric Gravimeter of the Automated Gravimetric System."

Keywords: sensitive element, gravity acceleration measurement, automated UAV control system, three-coordinate piezogravimeter, sensitive element.