

## ABSTRACT

The master's dissertation consists of an introduction, two chapters, conclusions, a list of used sources and appendices. The total volume of the work is 75 pages. The dissertation contains 29 figures, 40 tables. The list of used sources includes 22 names.

**The purpose and objectives of the study.** The aim of this work is to evaluate the influence of the shape of the ultrasonic beam trajectory on the metrological characteristics of the flow meter. Achieving this goal involves solving the following tasks:

- substantiation of data transmission technology for the creation of an automated control system for fluid flow by ultrasonic method;
- generalization and analysis of the current state of ultrasonic flowmeters;
- development of a mathematical model of the instrument transformation characteristic;
- creation of the measurement error mathematical model;
- conducting mathematical modeling of the flowmeter;
- reproduction of the hydraulic channel by means of CFD-technologies;
- measurement error estimation.

**The object of study** is the process of determining the metrological characteristics of the flow meter.

**The subject of the study** is the time-pulse single-beam ultrasonic flowmeter of the system of automated control of fluid flow by ultrasonic method.

**Research methods:** the methods underlying the work are based on the basic laws of hydrodynamics (Bernoulli, continuity equation) to estimate the pressure loss in the hydraulic channel of the flow meter; Computational hydrodynamics (CFD) methods using Ansys CFX software to confirm the results.

**Practical significance of the obtained results:**

- a mathematical model of a time-pulse single-beam ultrasonic flowmeter with reflection was created.

**Personal contribution of the applicant.** The development of scientific results to be defended is to develop a mathematical model of time-pulse single-beam ultrasonic flowmeter with reflection.

**Approbation of dissertation results.** The main provisions and results of the dissertation were reported and discussed at the scientific-practical conference "Efficiency of engineering solutions in instrument making" (Kyiv, 2021).

**Publications.** The results of the work are published in the materials of the 1 conference.

**Key words:** flow rate, automated flow control system, single-beam ultrasonic flowmeter, reflection of ultrasonic beam, metrological characteristics.