

## ABSTRACT

The master's dissertation consists of six chapters, 90 pages, 22 illustrations, 30 tables, 25 sources of literature have been studied.

In the first section, an analytical review was conducted, in which the object of control was considered. The analysis of smoke detection methods is carried out.

In the second section, the optical system of our smoke chamber was calculated. A lens for external fire alarm has been designed and modeled.

In the third section the electric scheme was developed, all important accessories which are necessary for stable work of the device are selected.

In the fourth section the complete design of our device is constructed.

The fifth section describes the software that fully satisfies us and meets our requirements for an automated system.

The sixth chapter outlines the main advantages of our project over competitors. Advantages of using fire protection systems rather than single devices is a complete connection that will signal to devices that do not detect smoke command to notify the fire, in one installation. That is, if the owner of the house does not hear a signal from the sensor which detects smoke, he will hear it from a device that is nearby.

The purpose and objectives of the study

The purpose of the study is to design an automated device for smoke detection.

During the study to solve the following problems:

1. Carry out modeling of optical units of the device.
2. Analyze the methods of optical control.
3. Justify the choice of ultrasonic method of non-destructive testing based on the TOFD method.
4. Calculate the optical system.
5. Develop a functional diagram of the system and calculate the main components, based on the calculations to develop an electrical circuit diagram.
6. Calculate the main automation components, create a system model in the SolidWorks software environment

The object of research is the process of smoke detection by optical method.

Subject of research - optical methods for the study of fine particles.

Research methods are based on the use of theoretical foundations of optical control; calculations of the main parts of the system and the development and design of the design of an automated system in SolidWorks.

Scientific novelty of the obtained results:

Improvement and optimization of automated smoke detection system

Keywords: optical system, SolidWorks Node, two-wave technology.