

Abstract

The master's dissertation consists of the introduction and 5 sections, the conclusion and the list of used literature. The full volume is 95 pages, including 32 illustrations, 28 tables, 15 literary sources and 4 appendices.

Topicality of the topic: The temperature often use as an information parameter for the diagnosis of industrial equipment, it characterizes the state of this equipment. The temperature have also particular importance during control of technological processes. The accuracy of temperature regime often determines not only the quality of the product, but also strategically important opportunities for using it for specific purposes. Among the most common devices used to measure temperature, pyrometers can be called, which allow to get the value of temperature without contact at a given point. In some cases, one point for temperature measurement is not enough. Often, there is a need for a complete thermogram of the object. For this purpose, a device such as a thermal camera can be used to visualize the temperature distribution on the object's surface. However, compared with a pyrometer, the thermal imager is a complex and, accordingly, an expensive device that does not always justify its value.

An alternative to the use of thermal imaging technology in some cases may be a system of computer information processing, which will restore the complete picture of the temperature field according to the measurements at individual points of the array. The topicality of this alternative is that the pyrometric device with its software could compete with the thermal imaging technique in accuracy of thermogram reproduction. This approach will greatly simplify the functional scheme of the control device.

Also, at present, the reconstruction of thermal fields has many unresolved issues: the choice of an optimal method of reconstruction, the determination of the optimal number of temperature measurement points, depending from the size of the object for the thermal field reconstruction, increasing the accuracy and speed of reconstruction.

The purpose of the research: to choose an optimal method for thermal field reconstruction, to determine the optimal number of temperature measurement points, depending from the size of the object for the thermal field reconstruction, improve the accuracy and speed of thermal fields reconstruction.

Tasks:

1. Review of the methods of reconstruction and processing of thermal fields;
2. Analysis interpolation methods;
3. Development of the device for experimental research;
4. Development of computer programs and programs for optimizing the quantity of measurements;
5. Experimental investigations of the possibility of restoring the thermal field based on the results of separate measurements of temperature;
6. Development of a method for optimizing the number of measuring points for the restoration of a thermal field with a given error;
7. The theoretical substantiation and conclusions.

The object of research is the thermal field of the object of control.

Subject of research - methods of reconstruction of thermal fields.

Key words: reconstruction of thermal images, device for scanning.