

## **Abstract**

This master's thesis consists of 90 pages, 40 illustrations, 25 tables and 18 literary references.

In the master's dissertation was carried out research of possibilities of construction of an ultrasonic system for control of bones of a forearm. A system has been proposed that includes six linear antenna arrays, active groups of linear antenna arrays can be used as phase antenna arrays.

Possible sound schemes in the system are investigated. Two operating modes of the system are proposed, the first is the definition of the presence of a crack, the second finding the size of the displacement. The study found that the most effective is the mirror-shadow method, but it greatly complicates the algorithm of the system, and it requires initial setup. Also, in this system, radiation in two directions simultaneously at different frequencies is proposed in order to increase the reliability and speed of control in the inclined beam. The modern element is analyzed, which satisfies the requirements of the system with the help of broadband composite sensors.

The purpose of the work is to study the feasibility of building a system for the control of human bones on the basis of phased array.

Analysis of the modes of doing phased array, the detection of side effects of phased array in the implementation of control, and the development of methods of their oppression.

The object of the research is the process of spreading ultrasound waves in the forearm.

Subject of research - the methods and means of constructing an ultrasound system for bone control. Means of increasing the reliability and performance of control.

**Key words:** ultrasound system, phased array antenna, linear antenna array, ultrasound, directional diagram.