

ABSTRACT

The master's dissertation consists of list of notations, an introduction and 5 sections, a conclusions and a list of references. The total volume is 114 pages, with 56 illustrations, 27 tables and 29 references.

This topic is relevant because the need for automation is growing rapidly in various industries. With the development of new technologies and computer technology, it has become possible to solve many issues in the field of automation and optimization of certain processes, which began to be performed much faster and better.

In this master's dissertation an automated system for control of multilayer structures by the method of free oscillations was developed. The system consists of hardware and software. Acoustic oscillations with a certain frequency are excited by means of hardware. The hardware includes: acoustic transducers, pulse generator NE555 with a transistor key. The software part is developed in the Matlab environment. It performs such functions as receiving a signal from an acoustic transducer, processing (classification) of data using the neural network algorithm ART-2 and visualization of results.

The developed system has a fairly low cost, so it can be used both in research and in production in areas related to non-destructive testing.

Keywords: neural network, automation, free oscillation method, Matlab.