Abstract

This master's thesis consists of 85 pages, 50 illustrations, 35 stamps and 24 literary references.

In this dissertation features of the use of orthogonal methods of measuring signal parameters during the design of eddy-current flaw detectors based on microcontrollers are considered. The author analyzes the new structure of a flaw detector, which consists of one measuring channel, and implements an orthogonal measurement method, has very low power consumption, small dimensions and corresponding cost. Experimental investigations of the proposed structure of the eddy current flaw detector on a special experimental model were carried out, where simulation of possible defects that could result both in phase change and amplitude of the measurement signal with the help of the high-precision synthesizer of signals SDG102, firm SIGLENT was carried out, which confirmed the high metrological capabilities of this structure.

To study the dependence of the accuracy of the determination of the parameters of the amplitude and phase of the information signal obtained in the vortex current control using the proposed orthogonal processing method, a simulation was performed in the Matlab software package, which confirmed the high accuracy of the determination of the above parameters of the signal for different ratios of signal / noise.

The purpose of the work is to explore the possibilities of developing eddy-current flaw detectors on microcontrollers, with low power consumption and low cost.

The object of the research is the process of obtaining signals in the eddy current control, and determining their informative parameters (phases and amplitudes).

Subject of research - methods and means of signal processing, to improve the accuracy and speed of determination of parameters in eddy current control.