

## ABSTRACT

The thesis is presented in 74 pages. It contains 2 appendixes and bibliography of 28 references. 23 figures and 7 tables are given in the thesis.

### **Topic relevance.**

Noise – is one of the most pressing problems in sound processing. It exists everywhere. Nature noise can be very diverse, so impossible to find a perfect algorithm for denoising.

In cases where noise has a considerable intensity, its presence can significantly impair quality of processing, analysis and speech recognition. When analyzing noisy recordings in forensic purposes denoising is the only goal.

Archival audiohramy of scientists, writers and politicians have great historical value. The possibility of restoration and reconstruction using best methods is crucial for the preservation of cultural and historical heritage.

**Thesis connection to scientific programs, plans, and topics.** The thesis was prepared according to the scientific research plan of the Applied Mathematics Department of the National Technical University of Ukraine “Kyiv Polytechnic Institute.”

**Research goal and objectives.** The goal of this thesis is to increase quality of noised speech signal by developing method and software using discrete wavelet transform.

To accomplish this goal, the following objectives were reached:

- systematize existent methods for increasing quality of noisy speech signal;
- improve the thresholding procedure of discrete wavelet transform for increasing quality of noisy speech signal;
- implement software for increasing quality of noisy speech signal;
- carry out experiments for developed software;
- analyze of the results.

*Object of research* is methods for increasing quality of noisy speech signal.

*Subject of research* is applying discrete wavelet transform for increasing quality of noisy speech signal.

**Methods of research.** To solve the task, the following methods were used: discrete wavelet transform (for denoising speech signal); methods of the theory of algorithms and programming (for implementing the developed algorithms); methods of probability theory and mathematical statistics (for carrying out experiments).

**Scientific contribution** is in the following:

- improving the thresholding procedure of discrete wavelet transform using the average value of the adjacent samples.

**Practical value of obtained results.** Methods are proposed for increasing quality of noisy speech signal using discrete wavelet transform with improved thresholding procedure. The developed software can be used both for applications and for embedded systems.

**Approbation of the thesis results.** Basic ideas and results of the research were presented at the 8<sup>th</sup> scientific conference for students and postgraduates «Applied mathematics and computing» PMK-2016 and published in the book of abstracts for the conference and at 17th International Scientific Conference 2016 SAIT.

**Publications.** Thesis results are published in 2 scientific works:

- VIII scientific conference of masters and Ph.D. students "Applied mathematics and computing – AMC-2016." Thesis "Quality improvement automated system for noisy speech signal"

- XVII International Scientific Conference 2016 SAIT "Research methods for denoising speech signals"

**Keywords:** noise, speech signal, discrete wavelet transform.