**ABSTRACT**

Bratova D.R. Formation of wavelet windows for filtering optical information. – Scientific work on the rights of the manuscript.

Thesis for a Master's Degree in the specialty - Metrology and information-measuring technique. National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, 2019.

The dissertation is dedicated to developing a method for optical information processing.

In engineering practice, different classes of transformation - Fourier, Laplace, etc. - are used to investigate the various signals of natural and artificial origin. Since the 1980s, wavelet transform (WF) has been predominantly used for frequency analysis of unsteady signals. Morle and Grossman were the first to do so, analyzing seismic data and coherent quantum states, respectively. The mathematical foundations of the WT were laid down by Meyer, who showed the existence of corresponding functions (wavelets) forming an orthogonal basis in the space L2 (R), that is, in the space of real functions whose square is integrated. Dobeshi made the transition from continuous to discrete WT and developed a class of wavelets that have maximum smoothness at a fixed length of their carrier. Currently, the scope of the WT is the approximation of functions and signals, their filtering and compression, searching for a signal of certain features, and more.

The master's thesis consists of four sections.

The first section analyzes the main advantages and disadvantages of wavelet and Fourier transforms and the features of their use. Examples of the main types of wavelets are also given.

The second section provides a general classification of wavelets and each of them in general. In addition, the general characteristics of various wavelets and their calculation methods are considered.

The third section is devoted to the development of a method of forming wavelet windows for filtering optical information. The third section presents the results of an analysis of the previous experimental works that show the possibility of creating synthesized digital nonlinear holograms as wavelet filters.

The fourth section is devoted to the development of a startup project "Formation of wavelet windows for filtering optical information" and to analyze the prospects of entering the market from a marketing point of view.

During the dissertation development the following works were written:

1. Братова, Д. Р. Метод дослідження цифрових голограм на основі вейвлет-аналізу / Д. Р. Братова // ХII Всеукраїнська науково-практична конференція студентів, аспірантів та молодих вчених «Погляд у майбутнє приладобудування», 15-16 травня 2019 р., м. Київ, Україна : збірник праць / КПІ ім. Ігоря Сікорського, ПБФ. – Київ : КПІ ім. Ігоря Сікорського, 2019. – С. 82–84..
2. Братова Д.Р. Использование сферы Пуанкаре в работе с поляризационными сингулярностями (Национальный технический университет Украины «Киевский политехнический институт имени Игоря Сикорского», Киев, Украина) / Д. Р. Братова // 12–я Международная научно-техническая конференция «Приборостроение – 2019», 13-15 ноября 2019 р., г. Минск, Республика Беларусь : сборник работ / Минск : БНТУ, 2019. – С. 385-386..
3. Братова, Д. Р. Аналіз можливості використання вейвлет-фільтрації / Д. Р. Братова // Ефективність інженерних рішень у приладобудуванні: збірник праць XV Всеукраїнської науково-практичної конференції студентів, аспірантів та молодих вчених, 10-11 грудня 2019 р. – К: ПБФ, КПІ ім. Ігоря Сікорського. – 2019.

Key words: wavelet transformation, Fourier transformation, nonlinear hologram, wavelet windows, optical information processing system, optical information processing method.