OPTOELECTRONIC METHODS OF INFORMATION PROCESSING

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Recently, information flows in various fields of science and technology have increased significantly. This calls for the creation of methods and systems for processing information that

have new quality indicators both in terms of throughput and dynamic characteristics. Optical - electronic methods of information processing can be used to solve such problems. The methods and systems of optoelectronic information processing acquire a special relevance in this connection, as they propose the most radical solution of the problems connected with overcoming the difficulties of further increasing the speed, accuracy and reliability of such systems. The general development of the field of optoelectronic information processing occurs in three directions: fundamentally new methodological bases for the construction of information systems are being developed; technical fundamentals of building optoelectronic systems; the optical-electronic systems for processing information are being developed and are being created [1].

With sufficient confidence it can be assumed that the future optical-electronic systems should mainly be based on holographic methods of information processing, on the methods of associativity in the distribution and development of information, and on methods of optimal review of informative fields. Holographic methods allow you to process information using new principles. The methods of holography solve the problem of the so-called full measurement, which in the optical range of waves is reduced to the problem of simultaneous recording of amplitude and phase information about a light wave propagating from an object. Based on the use of hologram properties, highly reliable computational, storage and recognition systems can be created, as well as systems of three dimensional representation of information [2].

Using the principles of associativity allows you to create optoelectronic computing, memory and distribution systems, which have fundamentally new capabilities, both throughput and speed.

The development of optimal survey methods when searching in the information space (or plane) of objects possessing the specified characteristics is of great importance for a number of classes of optoelectronic information systems. Note that, using various strategies for scanning informative spaces, it is possible to obtain significantly different search results, and the best performance will be a search process in which a priori information about the viewed space is

taken into account as much as possible.

At present, a wide range of elemental solutions have been developed, on the basis of which high-efficiency optoelectronic information processing systems can be created.

To very promising elements of optoelectronic systems can be attributed quantum mechanical processors, fiber optic elements, electroluminescent devices, as well as semiconductor microelectronic and integrated circuits.

It is now obvious that one cannot expect significant progress in the field of information technology if one assumes the use of only "traditional" optoelectronic elements. Therefore, the development of new optoelectronic elements based on the use of new physical phenomena and the latest technology is of particular urgency.

Continuously improving the optoelectronic information systems, this is associated with a constant increase in the requirements for expanding the range of functional capabilities of such systems, improving performance, reliability, etc. [3]

In some cases, these requirements cannot be met by existing methods, and then the task is to develop fundamentally new solutions. In connection with this, research is of particular urgency, the goal of which is to create new methods and principles for constructing optoelectronic information systems. Apparently, in the near future it is not possible to create completely optical information and computing systems in which light radiation simultaneously will be, carriers of information and will perform the functions of control signals.

When creating optoelectronic information systems, the latest methodical methods of information processing, developed in the field of science, which is now commonly called "computer science", are comprehensively used. In the principles of constructing such systems, the latest methods of multi-mode search with switching trajectories, methods of rational and in

some cases optimal viewing of space in the collection of information, the principles of associativity, the principles of holographic processing of information, etc., are used.

Thus, the main basis for the creation of optoelectronic information systems is, firstly, the newest methods and principles for the optimal processing of information flows and, secondly, the latest technical means to implement these principles. Only generalized, single consideration of these two components allows creating original and perspective solutions.

Recently, optoelectronic methods of processing information are recognized. There are a number of areas of information processing, in which these methods possess a complete monopoly. This is an optimal search for information in two-dimensional and three-dimensional space, processing visual information when it is remotely transferred from hard-to-reach spaces, tracking objects, traversing signs along the contour when reading, various two-dimensional image transformations,

The development of optoelectronic computer technology was greatly facilitated by the intensive development of optical radiation control facilities. At present, an arsenal of various devices designed for the module of light fluxes, control of spatial position, generation and amplification of optical signals, as well as logical processing has been created [4].

In many areas, optoelectronic methods of information processing can be used on a par with the old - "classical" methods, but they have certain advantages. It can be confidently asserted that with the improvement of the technology of fabricating optoelectronic elements, new methods will find wide application in a number of specific cases, for example, in optical-electronic storage and recognition systems, in optoelectronic systems designed to control a number of technological and physical parameters (velocities, levels, distances, etc.), as well as in some optoelectronic computer systems and devices.

A large group of optical-electronic information systems is occupied by tracking systems (time, pulsed, hourly, phase and amplitude). Optical tracking systems have recently become increasingly widespread in various fields of technology: when data is entered into computers

(electronic computers), when controlling various objects and apparatus, when processing the results of scientific experiments, in the automation of many technological processes, and so on.

A variety of tasks for processing visual information are solved using optoelectronic survey and retrieval systems and remote image transmission systems. For the review of space and image analysis, various methods are used that have different information capabilities. The choice of a rational method of image analysis is very important, since it largely determines the information capabilities of the entire optoelectronic system. Very promising are new methods and means of functional transformation of information contained in a two-dimensional image. These methods make it possible to identify the most significant information with its classification and recognition.

References

1.□□□□□□□□□□□□□□ Катыс Г.П. Оптико-электронная обработка изображений // Москва.,1973. 449с

2. King M. G. A new Approach to computer—generated holography. Appl. Optics, 1970, vol. 9, N 2, p. 471—475.

3. Goel James E., Stanley Robert D. Optical wavequides bring Lasser communication closer «Electronics», 1970, v. 43, N 18, p. 60—67.

4. Marquis D. C. Optical tracking a brief survey of the field. Appl. Optics, 1966, v. 5, N 4, p. 481—487.

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