

ABSTRACT

Relevance. One of the modern effective methods for analyzing various scientific data is the computer visualization of these data, which is widely used both in theoretical and experimental studies.

According to the results of scientific analysis of the current state of development of intellectual information technologies, we can conclude that visualization as the latest intellectual and information technology (where the basic component and mechanism of action are the principle of figurative processing of information) are at the initial stage of their development. The ideology of the development of computer systems of a fundamentally new type, which work mainly not on the level of processing of digital (symbolic) information, but operating images began to form in the 90 years of the twentieth century.

J. Clark, who in 1981 organized the company "Silicon Graphics Intl" (SGI), wrote a programmatic scientific work that was published by many universities in the world. The task defined by the scientist was expressed in this way - to help a person by the computer to work in the world of visual images.

Recently, there has been a tendency to combine efforts and the integration of scientific research and practical developments of intellectual-information visualization systems on an international scale. So, the American Space Agency (NASA) published several years ago an official document addressing organizations that would like to participate in a new project to create a multiplayer online universe, that is, a virtual virtual space.

Visualization of spatial data is used mainly in the tasks of scientific visualization. Scientific visualization is the creation of graphic images that, in the most informative form, reproduce the significant aspects of the investigated process or phenomenon. In this case, a large amount of simulation results are presented in a compact, easily perceived form. Representation in the form of graphic images allows the researcher to see the investigated system or process from the inside, which would be impossible without visualization.

The task of simulating and visualizing the work of a magnetized body divider that moves in space and can rotate is an important application problem, which is still unresolved.

The above considerations substantiate the relevance of the chosen research topic.

The **purpose** of the study is to develop application software for visualizing the dynamics of a magnetised body distributor with six degrees of freedom, which reduces the cost of extraction of iron ore by segregation of high-metal ore at the mining stage in a quarry.

The purpose of the dissertation paper determines the necessity of solving the following **tasks**:

- the analysis of the subject area;
- analysis of data visualization technologies;
- construction of mathematical model of motion of a magnetized body with six degrees of freedom in external gravitational and magnetic fields;
- research and selection of methods and means of implementation;
- development of algorithms and software design;
- implementation of developed algorithms in the form of software visualization of dynamics of a magnetized body separator with six degrees of freedom.

Object of research - the processes of creating application software data visualization systems.

Subject of research - methods and means of software implementation of systems visualization of the dynamics of objects with six degrees of freedom.

Research methods. To achieve the tasks, methods of analysis, synthesis, mathematical modeling, numerical methods, information systems modeling, object-oriented analysis and programming are used.

Scientific novelty of the obtained results. As a result of solving the problem of the dissertation research, the following new scientific results were obtained: the criteria for classification of data visualization technologies were formulated and, according to the formulated criteria, the classification of the data visualization technologies has been satisfactorily fulfilled.

The following results of a dissertation study are valuable for practice:

- the classification of data visualization technologies that made it possible to systematize existing data visualization technologies;
- algorithms for data visualization, which enabled to implement applied software visualization systems for dynamic systems simulation;

- an application software system for visualizing the dynamics of a magnetized body distributor with six degrees of freedom has been developed, which reduces the costs of extracting iron ore by segregation of high-metal ore at the mining stage in the quarry.

Personal applicant's fee. All scientific results presented in the dissertation are obtained by the competitor personally.

Approbation of the results of the dissertation. The main results of the dissertation work were tested at the following conferences: IV International Scientific and Practical Conference "Methodology of Modern Research" (Dubai, UAE, 31.03.2018); I International Scientific and Practical Conference of Young Scientists, Postgraduates and Students "Modern Information Technologies and Systems in Management" (Kyiv, April 19-20, 2018); III International Scientific and Practical Internet Conference "Problems and Prospects for the Development of Modern Science in European and Asian Countries" (Pereyaslav-Khmelnysky, April 30, 2018); annual (2018) scientific conference of teachers and students of NTUU "KPI im.I Sikorsky".

Publications The main results of the dissertation research are published in 3 scientific works, among them: 2 - individual; 1 article - in a foreign scientific journal (indexed in international science-computer databases) [1]; 2 publications - conference materials [2, 3].

DIFFERENTIAL EQUATIONS, VISUALIZATION, MATHEMATICAL MODEL, DYNAMICS, MAGNETIZED BODIES, MAGNETIC FIELD, SOFTWARE.