ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 6, Issue 6 , June 2019

Study on Three-Phase Fluctuations in Subharmonicheskogo Excitations Jelektrofer (P) Omagnitnyh Chains

Tovbayev A.N

Candidate of Technical Sciences

ABSTRACT: In this work the properties three-phase jelektrofer (p) omagnitnyj circuit opisyvajushhejsja using systems of nonlinear differential equations in general form a mathematical model of the phenomenon avtoparametricheskij oscillation. The adequacy of the developed mathematical model is achieved, taking into account the key factors and conditions in which covered the process. With increasing the adequacy of mathematical model is complicated by its appearance, algorithmization tasks on a PC.

KEYWORDS: Nonlinear circuit avtoparametricheskie oscillation, frequency converter, finite-difference methods numerical methods , mathematical models .

I.INTRODUCTION

Considered three-phase jelektrofer (p) omagnitnyh chains described using systems of nonlinear differential equations (a combination of differential operators), forming a mathematical model of the phenomenon. the adequacy of the developed mathematical model is achieved, taking into account the key factors and conditions in which occurs the process under consideration. With increasing the adequacy of mathematical model is complicated by its appearance, algorithmization of tasks on a PC.

When this special place is given to the adequacy of the mathematical model and the efficiency of the algorithm implemented on the PC.

The adequacy of the model are closely related to the ability to get almost important conclusions and recommendations. You should note that if a mathematical model is adequate, it allows not only to determine the quantitative characteristics of the studied processes, but also to discover new phenomena considered processes.

One of the basic techniques, which makes it possible to determine the trend of the desired variables is finite-difference approximation of differential operators of the mathematical model of the process.

The widespread use of the finite-difference methods for solving the problems of technological process resulted in a comprehensive study of them, both in terms of forecasting the object over time and the impact on them through a set of technical and mathematical parameters.

II.ENERGY EFFICIENCY

Solve complex problems using finite-difference methods tend to represent a combination of differential build analogues tasks, how to implement them. Therefore, progress in constructive theory of finite-difference methods must mutually agreed development of these two areas of research. When developing numerical methods should involve all available methods of studying tasks: analytical, accurate decisions assimtoticheskie evaluation, dimensional analysis, and experimental data.

Numerical methods implemented on the PC in terms of computational experiment must be economical, versatile, also shodimymi and stable relative to rounding errors.

When dealing with complex tasks, should pay particular attention to the conservative finite-difference analogues of the considered processes, based on the law of conservation of energy.

In order to write the differential scheme of approximating describes the differential equation with specified initial conditions, you must take the following steps:

-You must select the step of integrating temporary layer which provides a conservative course-difference model;

-spot area of flux argument (time) in the area of discrete it changes;

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 6, Issue 6 , June 2019

-replace the differential operators some differential operator, as well as formulate a Delta equivalent to primary data.

As a result, on the basis of the above procedure, you can solve a math problem using PC.

Look at the technology of computing experiment, with which you can solve the technological problem.

Lately, both in the domestic and foreign research great attention is given to the numerical experiment as a method of research using new information technology [1, 3].

III.RESULTS AND DISCUSSIONS

Computational experiment took the main part in the research of the process and includes: problem statement, an algorithm for solving tasks, programming in algorithmic language, conduct based on PC analysis of numerical calculation (fig. 1).

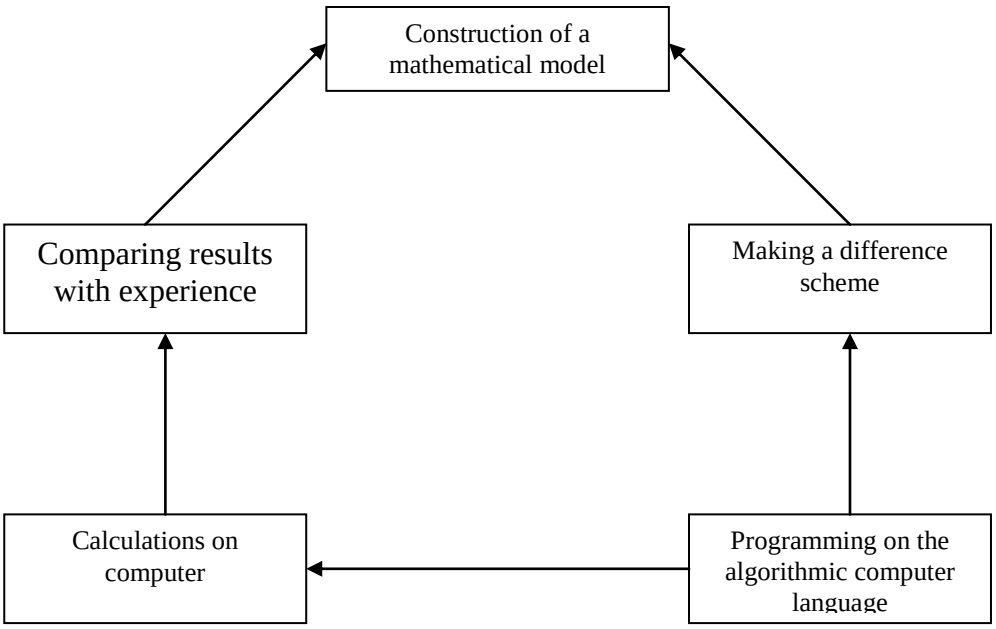

Fig.1.

To conduct numerical experiment, you must select the specific method and algorithm for solving the problem. Analytical methods for solving technological challenges suitable for simplified models of the process in which it is impossible to take into account all the natural factors, boundary and initial conditions. With the advent of a new generation of PC with great speed and memory began to develop, and numerical methods are effectively implemented on PC for the decision of tasks of technological processes. The simplest scheme of technological cycle of computational experiment is shown in Fig. 2.

ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 6, Issue 6 , June 2019

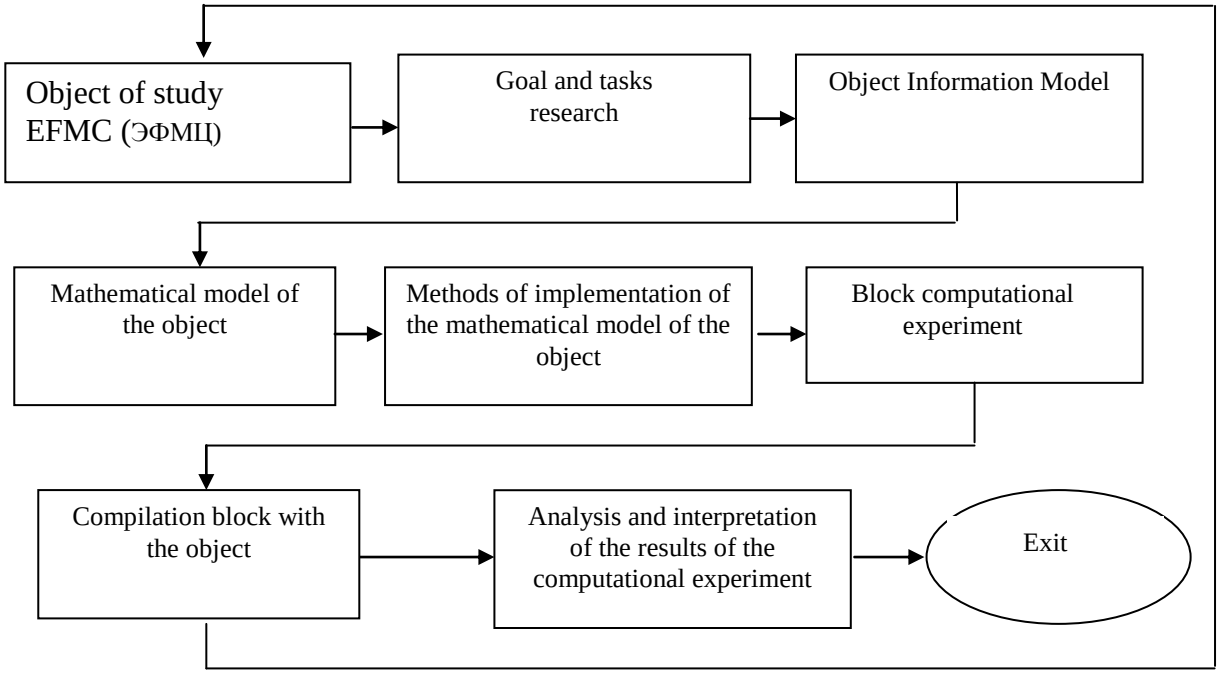

Fig. 2.

The focus of computational experiment is the control and analysis of the results of the calculations on the basis of certain criteria for the evaluation of numerical calculations.

Under the supervision of the computational experiment should understand numerical experiment complex activities which provide reliable results with a given degree of accuracy. Numerical experiment control procedure computing experiment includes the material balance equation, the conservation laws of various types, etc.

IV. CONCLUSION

Another issue holding numerical experiment is saving time implementation of this task and memory PC. This goal is achieved by increasing the integration time step. But here it must be emphasized that increasing the integration step can lead to a wrong result because of rounding error accumulation.

To avoid such situations in the present work used uneven step integration to a temporary variable, resulting in fewer nodes, thereby decreasing the amount of processing on the PC, which leads to slower growth errors rounding errors. To achieve this goal, measure error of approximation should be changed in the interval [2]

$$2^{-g} \cdot \varepsilon \le \Delta t \le \varepsilon,$$

where - $\varepsilon > 0, \quad g \ge 1$

constant parameters defined in the course of computing experiment. Given the above conditions, integration time step is selected as follows:

$$\begin{cases} \Delta t_p = 0.5\Delta t_{p-1}, & \Delta t > \varepsilon, \\ 2\Delta t_{p-1}, & \Delta t < 2^{-g} \cdot \varepsilon. \end{cases}$$

Definition Δt must run from the condition

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 6, Issue 6 , June 2019

$$\Delta t' < \Delta t_p < \Delta t'',$$

Where is $\Delta t''$ - -determined by demand conditions of stability and convergence of the computational algorithm; $\Delta t'$ Select from reasons to limit the growth of rounding errors.

Thus, identifies the main criterion for holding numerical calculation on a PC with which you can implement the tasks sequentially.

REFERENCES

1. Samara A.A. Theory different schemes-m.: Nauka, 1987. -with 656.
2. Kadomskaja K. N., Markvjavichus L. V. Studying of internal overvoltage in distant jelektroperedachah to EDCM//electricity. - Moscow, 1967. -№ 7
3. Tovbaev A. N. Mathematical modelling of nonlinear oscillations in three-phase circuits and systems/jelektroferromagnitnyh/ Algorithm s.-Tashkent, 2003.-No. 90-78-84