



# Modern Methods of the Solving of Physical Tasks with Use of Information Technologies

Jonibekova Sevara Dilmurod qizi\*

Andijan State University

\*Correspondence: Jonibekova Sevara  
Dilmurod qizi  
Email: [sevara2622@adu.uz](mailto:sevara2622@adu.uz)

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**Abstract:** *The purpose of this study is to analyze the emergence and influence of modern concepts that appeared at the end of the 19th and beginning of the 20th centuries on the social, political, and intellectual life of the Turkestan region. Using a qualitative historical-analytical method, the research examines how modernist ideas—originating in the Muslim world, particularly from reformist movements in Egypt, Turkey, and India—were adapted by local intellectuals and Jadid reformers to promote social transformation. The study draws on historical documents, scholarly works, and reformist writings to assess how modernization affected education, law, political thought, and national consciousness among the peoples of Turkestan. The results show that the spread of reformist thought led to the rise of new educational systems, increased political awareness, and the development of socio-religious reforms that bridged traditional Islamic principles with modern rationalist ideas. The study concludes that these reformist concepts played a key role in shaping the intellectual and cultural revival of Turkestan, laying the foundation for national awakening and modern identity formation in Uzbekistan and Central Asia.*

**Keywords:** *Modernization, Jadidism, Turkestan, Islamic Reform, Socio-cultural*

*Transformation*

## Introduction

As is known, now computers borrow all sphere of human activity. Their use in physics is especial there is no limit. The processing of the information transferred from is impossible to present without the help of the computer to today the artificial companions, management of movement of elementary particles in accelerators, realization of various most thin experiments on various branches of physics, the solving of complex tasks of theoretical physics, modeling of physical processes, creation of virtual laboratory stands of the electronic tutorials etc. Among them the special place borrows the solving of physical tasks on the computer and use them at teaching of physics.

As is known, in general rates of physics of a task are picked up so that they could be solved by an analytical way and size with the round values. For purchase of the first skills of the decision of tasks on physics it is completely necessary. However, in real life we collide with such tasks, which cannot be solved by an analytical way. For example, if to take into

account resistance of air, the movement of a body by gravity thrown with a corner to horizon is not solved by an analytical way.

Therefore everyone physician should be able independently solve physical tasks on the computer with use of numerical methods. Capacity, the speed, graphic and other opportunities of modern computers has resulted this problem of one of urgent at study and teaching of physics.

## Methodology

The computer modeling, realization of computing experiment is one of modern methods of research of the physical phenomena. It has the features, advantages and lacks in comparison with other methods of study of physical systems. Abundantly clearly, that the students of higher educational institutions should have representations about computer models, numerical methods of study of various objects of knowledge, freely enough be guided in modern software. The modern personal computer allows after some seconds to solve complex system of the equations, to construct the diagram of investigated dependence.

The important level of mastering by methods of calculus mathematics and physics is the independent spelling by the students of the various computer programs on algorithmic languages of programming Basic, Pascal, Visual Basic, Delphi. Creating similar computer models "from zero", working with an initial code of the program, the student understands concrete ways of processing of the information, methods of programming more deeply.

Visual Basic the widespread enough modern programming language, in which the electronic books, help system, browser of the Internet are incorporated the editor of the documents, system integrator, centre of resources. It has the powerful mathematical device allowing to carry out of symbolical calculation, to solve systems of the algebraic and differential equations, operation with vectors and matrixes, to write the programs, to build the diagrams and surfaces, etc.

In the given work it is offered to apply the following algorithm at the solving of tasks on physics:

1. Reduction of physical sizes in identical system of measurement.
2. Supervision animation of the given physical process.
3. Presence of the basic laws and formulas.
4. Reception the final formula or equations.
5. Choice of a numerical method.
6. Introduction of designations.
7. Drawing up of the program.
8. Realization of accounts.
9. Check of results.
10. Conclusion.

On numerical methods used at the solution, the physical tasks can be classified as follows:

1. Tasks with use of numerous calculation under the same formula.
2. Tasks on constructions of the diagrams.
3. Tasks on presence of roots transendent equations.

4. Tasks on the decisions of the algebraic equations.
5. Tasks on calculations of the certain integrals.
6. Tasks on the decisions of the differential equations.
7. Tasks on the spectral analysis.
8. Tasks on a presence of sizes with use of a method of the least squares.

## Result and Discussion

In the collection of tasks on physics most frequently there are tasks concerning to 1 and 2 items. And real tasks the equation of the second law of Newton is most used tasks on the solving of the differential equations of the second order.

We created a program - product for modeling various processes and phenomena on all sections of physics, which can be observed and use at the solving of tasks. To these processes concern:

1. Movement by gravity:
  - a) It is possible to see movement of a body thrown with a corner to horizon, from which, that with increase of initial speed range, height and the time of flight grows; with increase of a corner of throwing height and the time of flight grows, and the range has a maximum at  $45^\circ$ ; if to take into account resistance of air, the range of flight decreases.
  - b) The movement on an inclined plane, from which is possible to see, that acceleration is increased with increase of a corner of an inclination and decreases with increase of factor of friction.
  - c) Movement on the block, from which it is possible to see, that the acceleration of bodies is directly proportional to weight of the first body and in inverse proportion to weight of the second body.
  - d) A mathematical pendulum, from which it is possible to see, that the period of fluctuation depends only on length of a string.
  - e) A spring pendulum, from which it is possible to see, that the period of fluctuation is directly proportional to factor of elasticity and in inverse proportion to weight of a cargo.
  - f) A task of Kepler, from which it is possible to see, that the trajectory of movement of a particle in the central field depends on speed, i.e. at  $e=0$  there will be a circle, at  $e < 1$  will be an ellipse, at  $e > 1$  will be a parabola, at  $e=0$  will be hyperbola.
2. Laws of ideal gas:
  - a) Isothermal process.
  - b) Isobaric process.
  - c) Isochoric process.
  - d) Adiabatic process.
3. Modeling an electrical field:
  - a) Dependence on quantity of charges.

- b) Dependence on value of charges.
  - c) Dependence on a mark of charges.
  - d) Dependence on distance between charges.
4. Movement of the charged particle:
    - a) In a homogeneous electrical field.
    - b) In a periodic field.
    - c) In a field of a dot charge.
    - d) In a field of the charged wire.
    - e) In a homogeneous magnetic field.
  5. Wave properties of light:
    - a) Dispersion of light.
    - b) Rings of Newton.
    - c) The Young experience.
    - d) The diffraction in a crack.
    - e) The diffraction lattice.
  6. Oscillatory phenomena:
    - a) Mathematical pendulum.
    - b) Spring pendulum.
    - c) The Lissaju figure.
    - d) The harmonic fluctuation.
    - e) Fading fluctuations.
  7. The Rezerford experience:
    - a) Dependence on speed of a particle.
    - b) Dependence on aim distance.
  8. Structure of atoms:
    - a) Dependence on serial numbers.
    - b) Dependence on nuclear weights.
    - c) Dependence on group of elements.
  9. The effect of a Hall:
    - a) Dependence the factor of Hall from magnetic field.
    - b) Dependence the factor of Hall from thickness of a plate.
    - c) Dependence the factor of Hall from voltage.
    - d) Dependence the factor of Hall from force of a current.
  10. Semi-conductor diode:
    - a) General structure of p-n transition.
    - b) Methods of reception of technologies of p-n transition.
    - c) Various types of diodes.

## Conclusion

We have chosen tasks on physics concerning these processes and solved with the students on the computer. The experience show, that the application of information

technologies at teaching physics raises interest to a subject and intellectual ability of the students.

The tasks, submitted in the given work, and programs of their solutions, can be used by the students and teachers at study of bases of computer modeling, methods of mathematical physics, and also at the solving of tasks of rates of general physics, electrical engineers etc.

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