

**LEMBAR**  
**HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW**  
**KARYA ILMIAH : PROSIDING**

Judul Prosiding (Artikel) : Modeling of Nitrogen Transformation in an Integrated Multitrophic Aquaculture (IMTA)  
 Jumlah Penulis : Silfiana, **Widowati**, Sapto P Putro, T.Udjiani/ 4 orang  
 Status Pengusul : penulis ke-2  
 Identitas Prosiding : a. Nama Prosiding : Journal of Physics: Conference Series  
 b. Nomor ISSN : 17426588, 17426596  
 c. Volume, nomor, bulan tahun : 983 (2018) 012122  
 d. Penerbit : IOP Publishing  
 e. DOI artikel (jika ada) : 10.1088/1742-6596/983/1/012122  
 f. Alamat web Prosiding  
 URL PROSIDING : <http://iopscience.iop.org/article/10.1088/1742-6596/983/1/012122>  
 URL ARTIKEL : <http://iopscience.iop.org/article/10.1088/1742-6596/983/1/012122/pdf>  
 g. Terindeks di Scopus SJR (2018) 0,221; Q3  
<https://www.scimagojr.com/journalsearch.php?q=130053&tip=sid&clean=0>

Kategori Publikasi Prosiding :  Prosiding Internasional Terindeks  
 (beri ✓ pada kategori yang tepat)  Prosiding Internasional  
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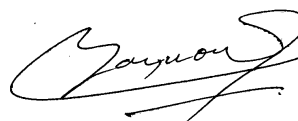
Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi prosiding (10%)	3,00	2.25	2.63
b. Ruang lingkup dan kedalaman pembahasan (30%)	8,37	6.00	7.19
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	8,98	6.00	7.49
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	8,35	7.50	7.93
<b>Total = (100%)</b>	<b>28,70</b>	<b>21.75</b>	<b>25.23</b>
<b>Nilai Pengusul = 40% x1/3</b>	<b>3,83</b>	<b>2.90</b>	<b>3.37</b>

Reviewer 2



Prof. Dr. St. Budi Waluya, M.Si  
 NIP. 196809071993031002  
 Unit kerja : Matematika FMIPA UNNES

Semarang, April 2020  
 Reviewer 1



Prof. Dr. Basuki Widodo, M.Sc  
 NIP. 19650506 1989031002  
 Unit kerja : Matematika FSAD ITS

**LEMBAR  
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Komponen Yang Dinilai	Nilai Maksimal Prosiding			Nilai Akhir Yang Diperoleh
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a. Kelengkapan unsur isi prosiding (10%)	3,00			3,00
b. Ruang lingkup dan kedalaman pembahasan (30%)	9,00			8,37
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9,00			8,98
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	9,00			8,35
<b>Total = (100%)</b>	<b>30,00</b>			<b>28,70</b>

**Nilai Pengusul = 40% x 1/3 x 28,70 = 3,83**

**Catatan Penilaian artikel oleh Reviewer :**

**1. Kesesuaian dan kelengkapan unsur isi prosiding :**

Penulisan artikel baik dan mengikuti standard penulisan artikel di Journal of Physics: Conference Series, yaitu abstract, Introduction, Methodology, Result and Discussion (IMRaD), Conclusion dan Acknowledgement. Artikel ini didukung dengan referensi yang sesuai.

**2. Ruang lingkup dan kedalaman pembahasan:**

Lingkup bahasan dari artikel ini adalah bidang matematika terapan, khususnya pada bidang model dinamis. Dalam artikel ini dibahas dengan baik tentang model dinamis dari proses transformasi konsentrasi nitrogen yang terdiri atas amonia, nitrit, dan nitrat. Model ini dapat digunakan untuk memprediksi penurunan nitrogen serta proses transformasi nitrogen. Relevansi hasil terkait pengaruh fitoplankton pada konsentrasi nitrogen.

**3. Kecukupan dan kemutakhiran data/informasi dan metodologi :**

Informasi yang disajikan relatif baru dan hasil yang diperoleh memuat substansi aplikasi yang penting. Sumber gagasan penulis untuk artikel ini banyak, komprehensif dan update, yang lebih sepuluh tahun terakhir hanya 2 paper dari 16 sumber yang dirujuk.

4. **Kelengkapan unsur dan kualitas terbitan:**

Artikel memenuhi standard penulisan dan isi untuk prosiding di Journal of Physics: Conference Series. Artikel ini terindeks di Scopus (Q3).

Surabaya, 17 April 2020  
Reviewer 1



Prof. Dr. Basuki Widodo, M.Sc  
NIP. 19650506 1989031002  
Unit kerja : Matematika FSAD ITS

**LEMBAR  
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Kategori Publikasi Prosiding :  Prosiding Internasional Terindeks  
 (beri ✓ pada kategori yang tepat)  Prosiding Internasional  
 Prosiding Nasional

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Prosiding Internasional Terindeks <input checked="" type="checkbox"/>	Prosiding Internasional <input type="checkbox"/>	Prosiding Nasional <input type="checkbox"/>	
a. Kelengkapan unsur isi prosiding (10%)	3,00			2.25
b. Ruang lingkup dan kedalaman pembahasan (30%)	9,00			6.00
c. Kecukupan dan kemutakhiran data/informasi dan metodologi (30%)	9,00			6.00
d. Kelengkapan unsur dan kualitas terbitan/prosiding (30%)	9,00			7.50
<b>Total = (100%)</b>	<b>30,00</b>			<b>21.75</b>

**Nilai Pengusul = 40% x 1/3 x 21.75 = 2.90**

**Catatan Penilaian artikel oleh Reviewer :**

**1. Kesesuaian dan kelengkapan unsur isi prosiding:**

Kesesuaian dan kelengkapan unsur cukup baik. Artikel terdiri atas 4 bagian: Introduction, Methods, Results and Discussion, Conclusion. Hanya didukung 16 referensi.

**2. Ruang lingkup dan kedalaman pembahasan:**

Ruang Lingkup dan kedalaman pembahasan cukup baik. Lingkup Matematika terapan sesuai dengan bidang ilmu pengusul. Pembahasan berkaitan dengan the dynamic model of nitrogen transformation processes concentration consisting of ammonia, nitrite, and nitrate (Terapan Matematika). Pendahuluan cukup baik menekankan nilai lebih dari artikel dengan memberikan overview penelitian terdahulu. Interpretasi dari hasil terutama gambar kurang ditonjolkan dalam pembahasan sehingga temuan kebaruan kurang ditonjolkan.

**3. Kecukupan dan kemutakhiran data/informasi dan metodologi :**

Kecukupan dan kemutakhiran data/informasi dan metodologi sudah cukup baik. Referensi ada 16 (2 dinatar jurnal sudah lebih dari 10 tahun). Hasil yang diperoleh cukup menunjukkan substansi kebaruan.

4. **Kelengkapan unsur dan kualitas terbitan:**

Kelengkapan unsur dan kualitas terbitan cukup baik. Artikel diterbitkan dalam Journal of Physics: Conference Series. Penerbit IOP Publishing. Terindeks di Scopus: SJR (2018) 0,221; Q3. Hasil Turnitin similarity index=13%. Kualitas unsur dan kualitas terbitan baik, namun masih terdapat sedikit proses editorial yang tidak teliti.

Semarang, April 2020

Reviewer 2



Prof. Dr. St. Budi Waluya, M.Si

NIP. 196809071993031002

Unit kerja : Matematika FMIPA UNNES



# ICMSE 2017

The 4<sup>th</sup> International Conference on Mathematics, Science, and Education  
Universitas Negeri Semarang, Indonesia

## CERTIFICATE

9274/UN37.1.4/SR/2017

This is to certify that

*Silfiana*

has participated as

*Presenter*

in the 4th International Conference on Mathematics, Science and Education (ICMSE)  
held by Faculty of Mathematics and Natural Sciences,  
Universitas Negeri Semarang, Indonesia  
on September 18-19, 2017



Prof. Dr. Zaenuri S.E, M.Si, Akt  
Dean



## ICMSE

International Conference on Mathematics,  
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Prof. Dr. Sutikno S.T., M.T.  
Conference Chair





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Journal of Physics: Conference Series  
Volume 983, Issue 1, 6 April 2018, Article number 012122  
4th International Conference on Mathematics, Science, and Education, ICMSE 2017; Semarang, Central Java; Indonesia; 18 September 2017 through 19 September 2017; Code 135773

## Modeling of nitrogen transformation in an integrated multi-trophic aquaculture (IMTA) (Conference Paper) (Open Access)

Silfiana<sup>a</sup>, **Widowati<sup>b</sup>** ✉, Putro, S.P.<sup>c</sup>, Udjiani, T.<sup>b</sup>

<sup>a</sup>Magister Program of Mathematics, Department of Mathematics, Faculty of Science and Mathematics, Diponegoro University, Indonesia

<sup>b</sup>Department of Mathematics, Faculty of Science and Mathematics, Diponegoro University, Indonesia

<sup>c</sup>Department of Biology, Faculty of Science and Mathematics, Diponegoro University, Indonesia

### Abstract

↕ View references (16)

The dynamic model of nitrogen transformation in IMTA (Integrated Multi-Trophic Aquaculture) is purposed. IMTA is a polyculture with several biotas maintained in it to optimize waste recycling as a food source. The purpose of this paper is to predict nitrogen decrease and nitrogen transformation in IMTA consisting of ammonia (NH<sub>3</sub>), Nitrite (NO<sub>2</sub>) and Nitrate (NO<sub>3</sub>). Nitrogen transformation of several processes, nitrification, assimilation, and volatilization. Numerical simulations are performed by providing initial parameters and values based on a review of previous research. The numerical results show that the rate of change in nitrogen concentration in IMTA decrease and reaches stable at different times. © Published under licence by IOP Publishing Ltd.

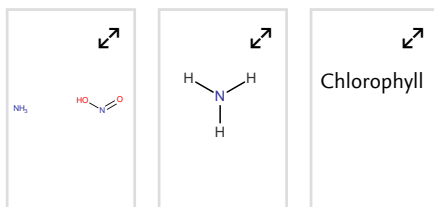
### SciVal Topic Prominence ⓘ

Topic: Benthos | Estuary | Biotic indices

Prominence percentile: 93.494 ⓘ

### Chemistry database information ⓘ

#### Substances



### Indexed keywords

Engineering controlled terms:

Aquaculture

Engineering uncontrolled terms

Food sources

Initial parameter

Nitrogen concentrations

Nitrogen transformations

Numerical results

Poly cultures

Rate of change

Waste recycling

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3 Citations in Scopus  
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3.79 Field-Weighted  
Citation Impact



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### Cited by 3 documents

Locally stability analysis of the Phytoplankton-Nitrogen-Phosphate-Sediment dynamical system: A study case at Karimunjawa aquaculture system, Central Java

Triyana, E. , Widowati , Putro, S.P. (2019) *Journal of Physics: Conference Series*

Low-power detection of food preservatives by a novel nanowire-based sensor array

Zappa, D. (2019) *Foods*

Bio-mitigation based on integrated multi-trophic aquaculture in temperate coastal waters: Practice, assessment, and challenges

Zhang, J. , Zhang, S. , Kitazawa, D. (2019) *Latin American Journal of Aquatic Research*

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# Source details

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Scopus coverage years: from 2005 to Present

Publisher: Institute of Physics Publishing

ISSN: 1742-6588 E-ISSN: 1742-6596

Subject area: Physics and Astronomy: General Physics and Astronomy

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$$0.59 = \frac{\text{Citation Count 2019}}{\text{Documents 2016 - 2018}} = \frac{18,254 \text{ Citations to date} >}{31,135 \text{ Documents to date} >}$$

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# ICMSE

International Conference on Mathematics,  
Science, and Education

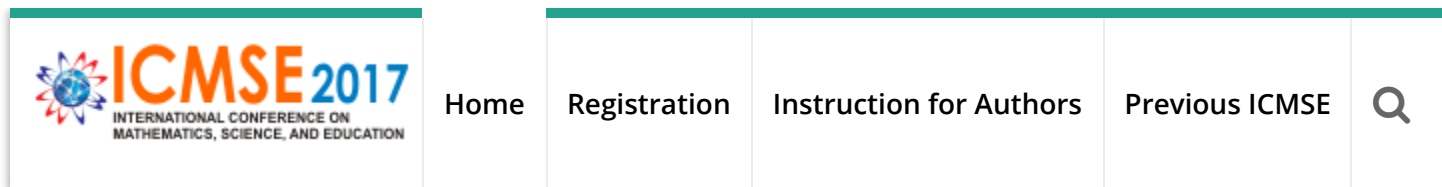
2017

DEKANAT  
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## Call for papers

**Roles of Mathematics and Science Researchs  
in Supporting Growth of Sustainable Natural  
Resources-based Industries**

<http://icmseunnes.com>



## Theme

**“Roles of Mathematics and Science Researchs in Supporting Growth of Sustainable Natural Resources-based Industries ”**

## DATE EVENT

18-19 September 2017

## PLACE

Aston Hotel, Jl. MT Haryono, No. 1, Sayangan, Semarang, Indonesia

## KEYNOTE SPEAKERS

- Dr. Ir. Paristiyanti Nurwardani, M.P. (Director of Learning and Student Affairs; Ministry of Research, Technology and Higher Education, Indonesia)
- Prof. Dr. Young Jun CHANG (University of Seoul, South Korea)
- Prof. Dr. Francis Q. Brearley (Manchester Metropolitan University, United Kingdom)
- Prof. Dr. Uda Hashim (Universiti Malaysia Perlis, Malaysia)

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Important Dates 

	Deadline
Abstract Submission	30 June 2017 31 July 2017 15 August 2017
Acceptance Notification	06 July 2017

- Prof. Dr. Ngurah Dewa Suprpta (Researcher & Entrepreneur, Udayana University, Indonesia)
- Prof. Dr. Duraisamy Sambasivam Sankar (Universiti Teknologi Brunei, Brunei Darussalam)

## INVITED SPEAKERS

- Prof. Dr. Atsushi Kohno (Fukuoka University, Japan)
- Assoc. Prof. Dr. Muhaimin Ismoen (Universiti Teknologi Brunei, Brunei Darussalam)
- Dr. Muhammad Kashif (Universiti Malaysia Sarawak, Malaysia)
- Dr. Cepi Kurniawan (Chemistry, Universitas Negeri Semarang, Indonesia)

## DESCRIPTION

The 4th International Conference on Mathematics, Science, and Education (ICMSE 2017) will be held in Semarang, Central Java, Indonesia on 18-19 September 2017. This conference is jointly organized by Faculty of Mathematics and Natural Science, Semarang State University, Indonesian Chemical Society, Indonesian Physical Society, Indonesian Biology Society, Association of Computer Science Higher Education, Indonesian Mathematical Society, and Indonesian Educator Science.

## GOALS & OBJECTIVES

The aim of the conference is to provide a platform to the researchers, experts and practitioners from academia, governments, NGOs, research institutes, and industries to meet and share cutting-edge progress in the field of mathematics and natural science. It provides an opportunity to enhance understanding of relationships between knowledge and research related to mathematics and science.

	05 August 2017 20 August 2017
Full Paper Submission	20 July 2017 15 August 2017 25 August 2017 29 August 2017 (extended) 03 September 2017 (extended)
Payment deadline	1 September 2017

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Prof. Dr. Sutikno, S.T., M.T.  
(+62-85865656282), (+62-  
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Prof. Dr. St. Budi Waluya M.Si	(Mathematics Department, Universitas Negeri Semarang, Indonesia)
Dr. Isnaini Rosyida S.Si, M.Si	(Mathematics Department, Universitas Negeri Semarang, Indonesia)
Dr. rer.nat. Adi Nur Cahyono S.Pd., M.Pd.	(Mathematics Department, Universitas Negeri Semarang, Indonesia)


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**2018**

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**International Conference on Mathematics, Science and Education 2017 (ICMSE2017) 18–19 September 2017, Semarang, Indonesia**

Accepted papers received: 23 February 2018

Published online: 06 April 2018

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# The density and compositional analysis of titanium doped sapphire single crystal grown by the Czochralski method

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**Abstract.** Titanium doped sapphire (Ti:Al<sub>2</sub>O<sub>3</sub>) crystal has attracted attention not only as beautiful gemstones, but also due to their applications as high power laser action. It is very important crystal for tunable solid state laser. Ti:Al<sub>2</sub>O<sub>3</sub> crystals have been success grown using the Czochralski method with automatic diameter control (ADC) system. The crystals were grown with different pull rates. The structure of the crystal was characterized with X-Ray Diffraction (XRD). The density of the crystal was measurement based on the Archimedes principle and the chemical composition of the crystal was confirmed by the Energy Dispersive X-ray (EDX) Spectroscopy. The XRD patterns of crystals are showed single main peak with a high intensity. Its shows that the samples are single crystal. The Ti:Al<sub>2</sub>O<sub>3</sub> grown with different pull rate will affect the distribution of the concentration of dopant Ti<sup>3+</sup> and densities on the sapphire crystals boules as well on the crystal growth process. The increment of the pull rate will increase the percentage distribution of Ti<sup>3+</sup> and on the densities of the Ti:Al<sub>2</sub>O<sub>3</sub> crystal boules. This may be attributed to the speed factor of the pull rate of the crystal that then caused changes in the heat flow in the furnace and then causes the homogeneities is changed of species distribution of atoms along crystal.

## 1. Introduction

Sapphire (Al<sub>2</sub>O<sub>3</sub>) single crystal is one of the most excellent and useful material for a number of high technology, optical and electro-optical applications [1]. As an optical material, sapphire has a broad transmission band spanning the ultraviolet, visible and infrared region. Sapphire has very good mechanical and physical properties, such as tensile strength, abrasion resistance, thermal conductivity and mechanical stability, which result in outstanding thermal shock resistance [2]. Doping sapphire with foreign ions can be used to modify the optical properties and makes the system useful for large variation application, such us tunable solid state laser [3-6] and optical waveguides [7-9].

Sapphire becomes a promising material for tunable lasers if doped with elements possessing wide absorption bands and wide emission regions [10]. The most interesting among such elements are Ti<sup>3+</sup>, Cu<sup>2+</sup>, V<sup>3+</sup>, Ni<sup>2+</sup>, Co<sup>2+</sup>, Cr<sup>3+</sup> and Mn<sup>2+</sup>, where these elements are included in the transition metals. The transition-metal ions are also excellent alternatives and they are widely used in laser crystals [11]. Trivalent titanium (Ti<sup>3+</sup>) is a transition metal ion that has very desirable broad absorption and emission



# Planning comparison between intensity modulated radiation therapy and intensity modulated proton therapy in a case of head and neck cancer

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**Abstract.** In this work, we made the comparison between IMRT plan and IMPT plan for a head and neck case. We used Prowess Panther to perform IMRT plan and LAP- CERR for IMPT plan. The result showed that IMPT plan had better coverage than IMRT plan. In the IMRT plan, normal structures received higher dose with higher volume. Especially, the maximum dose of spinal cord is 31.5 Gy (RBE) using IMRT technique compared to 13.5 Gy (RBE) using IMPT technique. These results showed that IMPT is beneficial for head and neck cancer compared to IMRT technique.

## 1. Introduction

Currently, traditional radiation therapy x-rays are still the most common type of radiation in curing cancer. However, the persisting problem is that significant dose delivered to normal tissue because of the characteristics of interaction of photons with matter even with the most advanced delivery technique. Proton therapy is the technique producing better conformity to target and better sparing to organs at risk. In this paper, Intensity Modulated Proton Therapy (IMPT) and Intensity Modulated Photon Therapy (IMRT) plans are generated for a head and neck patient. To make IMRT plans we used Prowess Panther, a commercial Treatment Planning System (TPS) and LAP-CERR (The Laser Accelerated Particle [1]- The Computational Environment for Radiotherapy Research [2]). The evaluation and comparison of the two kinds of radiation treatment plans were performed in term of physical quantity based on Dose Volume Histogram (DVH) and dose statistics for both target and organs at risk.

## 2. Methods

In this section, we will introduce some main features of dose algorithm and dose optimization of Prowess Panther and LAP-CERR. The definitions of PTV and PRVs and dose requirements also will be described here.

### 2.1. Prowess Panther

#### 2.1.1. Dose calculation algorithm

Collapsed cone convolution of radiant energy for photon dose calculation in heterogeneous media [3, 4] has been used to calculate absorbed dose. This method assumed transported energy process



# Implementation of small group discussion as a teaching method in earth and space science subject

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**Abstract.** In Physics Department Universitas Negeri Semarang, Earth and Space Science subject is included in the curriculum of the third year of physics education students. There are various models of teaching earth and space science subject such as textbook method, lecturer, demonstrations, study tours, problem-solving method, etc. Lectures method is the most commonly used of teaching earth and space science subject. The disadvantage of this method is the lack of two ways interaction between lecturers and students. This research used small group discussion as a teaching method in Earth and Space science. The purpose of this study is to identify the conditions under which an efficient discussion may be initiated and maintained while students are investigating properties of earth and space science subjects. The results of this research show that there is an increase in student's understanding of earth and space science subject proven through the evaluation results. In addition, during the learning process, student's activeness also increases.

## 1. Introduction

Generally, science educations have higher difficulties than the other subjects. Many physics students do not find physics interesting and many of them take the physics courses even at university level without an acceptable conceptual understanding of physics. The problem of this difficulties related to the gaps in their conceptual understanding that could still persist even after the completion of several courses in physics. One of the teaching method that usually used in physics is conventional learning. Conventional learning lies in the presentation of the material, which comes out of textbook and lecture notes. A traditional lecture is nearly always delivered as a monologue in front of the students. Only exceptional lecturers are capable of holding students' attention for an entire lecture period. It is even more difficult to provide adequate opportunity for students to critically think through the arguments being developed [1]. In previous research, the stages of the Cognitive Apprenticeship-Instruction (CA-I) model consisting of modeling, coaching, reflection, articulation, and exploration have been applied in mathematical physics subject. Nine out of ten indicators of reflective thinking abilities in solving mathematical physics problems have been adequately trained using these stages, although their achievements are not yet optimal. One remaining is the ability to accurately analyze the problems of mathematical physics still cannot be improved significantly [2].

