

INTERNATIONAL CONFERENCE
Krasnoyarsk, RUSSIA
8-9 October 2020



ASEDU

Advances in Science, Engineering
and Digital Education

Science & Technology
City Hall

«ASEDU-2020: Advances in Science, Engineering and Digital Education»

«Possibilities of the Maple computer algebra system in the study of set theory and combinatorics»

A A Olenev, K A Kirichek, E V Potekhina, O V Pelikh, A V Nazarenko



Problem statement

- The need to improve the efficiency and depth of mathematical training of students in the context of the introduction of new information and communication technologies.
- The basic section of both discrete and continuous mathematics is "Set theory", the study of which is a difficult task.
- Development of the application "Set theory" based on the Maplet package of the Maple computer algebra system.
- Visual demonstration of performing operations on sets.
- Acquisition of the skill of solving problems in set theory and the simplest problems in combinatorics.
- Control of solving problems in set theory.
- Control of the solution of the simplest problems of combinatorics.



Solution methods

- The developed application "Set theory" has the following features:
- 1. Introduce or automatically create new problems using operations (addition, union, intersection, difference, symmetric difference, Cartesian product) of set theory.
- 2. To check the correctness of the solution of problems in set theory and the simplest problems in combinatorics.
- 3. Solve problems for individual operations with instructions for each operation.
- 4. Refer to reference material and receive a message about the correctness of assignments.

- Analytical Testing Method:

```
answer: = (m, n) -> if (m = n) then RETURN (CORRECT) else RETURN (INCORRECT) fi:
```

```
>randomize (): >
```

```
F: = rand (8..15): G: = rand (3..5):
```

```
> A: = F ():
```

```
B: = G ():
```

```
answer: = A * B:
```



Conclusions

The Maple computer algebra system can significantly facilitate the teacher's work:

- 1) managing the independent work of a large number of students;
- 2) demonstration and implementation of the main provisions of set theory;
- 3) the formation of the ability and skill to solve problems of set theory and combinatorics.

- The application "Set theory" has been developed.
- An application for state registration for a computer program has been submitted.
- The certificate of state registration of the computer program "Program for visualization of the basic operations of set theory" was received (part of the developed application "Set theory").



Contacts

Stavropol State Pedagogical Institute

Olenev A.A. E-mail: olenevalexandr@gmail.com

Kirichek K.A. E-mail: KirichekKA@mail.ru

Potekhina Ye.V. E-mail: ekapotekhina@yandex.ru

Pelikh O.V. E-mail: pelih-olga@yandex.ru

Nazarenko A. V. E-mail: annavasilevna7@mail.ru

**«ASEDU-2020: Advances in Science, Engineering and Digital
Education»**