

On "*Mathematica Natsu no Gakkou*" (*Mathematica Summer School*)

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Abstract

In this presentation, I want to talk about how the "Mathematica Natsu no Gakko" program is run.

I also want to show some of the materials made there.

Then I want to discuss the problems we confronted, and plans for developing teaching materials in the future.

About "Mathematica Natsu no Gakkou"

Mathematica, a software system for mathematics, is well known among secondary school (high school) teachers in Japan.

But not many of them have used Mathematica in the classroom or have developed teaching materials that use it.

Even if some teachers have developed materials based on Mathematica, the use of those materials was limited to that teacher's school and seldom went beyond that school.

There weren't any opportunities for most teachers to use such materials even if they existed.

For teachers who are Mathematica novices, what is necessary is an opportunity to learn how to use Mathematica in the classroom and how to develop materials based on Mathematica.

A few years ago, we started Mathematica workshops for teachers of mathematics in several prefectures.

Many teachers who attended it realized that it was possible to use Mathematica in future mathematics education.

Unfortunately, these workshops were held in limited locations.

"Mathematica Natsu no Gakkou" is a project for providing the opportunity to develop Mathematica-related materials for teachers who do not have enough information on how to use Mathematica.

The first "Mathematica Natsu no Gakkou" was held in the summer of 1996 with the cooperation of Wolfram Research Asia Limited, the Mathematica User's Group in Japan, and Mathematica dealers in Japan.

It was a three-day event. About 20 teachers of secondary education who were eager to develop Mathematica-related materials worked together.

Each teacher completed one lesson based on an idea he/she brought.

The 4th workshop was held this summer.

So far, about 70 teachers have attended these workshops and various teaching materials have been developed.

Anyone can download and use them freely.

<http://www.hs.konan-u.ac.jp/math/Mathematica/>

(This pages is Japanese pages, English pages comming soon.)

This, I think, is the first place where mathematics teachers from all parts of the country can communicate with one another.

Types of materials

The objective of this workshop is to develop materials which can be used in a classroom setting.

Many types of materials have been made.

They are:

1) materials to present ideas to students

Many teachers are interested in 3D models and animations.

Because we cannot draw them on black-board.

Example 1.1

Example 1.2

Example 1.3

2) materials to be used by students for self-teaching

Some teaches can make materials such as text books.

Example 1.1

Example 2.2

Example 2.3

3) materials to introduce Mathematica as a programming language

There are some programming languages in mathematics text books in Japan.

BASIC is the most popular language for high schools level in Japan .

But *Mathematica* is the most suitable language in our curriculum.

Example 3.1

Thorough examination as to whether or not all of the materials developed at workshops can be used in all kinds of schools will be necessary.

Some Problems in this project

This project can create the teacher's network beyond the school and the prefecture.

Now, there are many staffs in this project.

We have about 100 teaching materials in this project.

But, there are some problems in this project.

They are:

1) Some teaching materials cannot be used by every teacher.

Every teacher made the teaching material with his individual teaching method.

But other teacher cannot use that material, because of the difference of teaching methods.

2) Some teaching materials are out of our curriculum.

Some teacher made the teaching material as out of our curriculum.

Then that material cannot be used all kinds of school.

3) Many *Mathematica* novices cannot attend this project.

Many *Mathematica* power users in high school have attended this project.

But *Mathematica* novices have not come. Novices avoided this project.

Many novices thought this project was too hard.

Some novices have made some materials in this project.

We will make another project, as beginner's training for teachers.

■ Contents of teaching materials

Natsu no Gakkou 1996

Natsu no Gakkou 1997

Natsu no Gakkou 1998

Natsu no Gakkou 1999

■ About the future education in Japan

In Japan, it seems to have become a requirement in the mathematics curriculum to not only utilize computers in mathematics, but to also teach programming in information science classes.

Internet or LAN is becoming essential to schools.

The possibility of introducing remote education or a credit system along with traditional classroom teaching is now being discussed.

There will be a demand for teaching materials that students in any situation can use.