Division of Electrical, Information and Communication Engineering	Research field	Mathematical Investigation	Lab. ID EI26
Laboratory web site			

Research subjects

In this laboratory, numerical modeling of physical phenomena associated with Industrial problems are studied, and besides studies associated with industrial problems, algebraic curves, real plane curves are also investigated.
1. The studies associated with industrial problems are. for examples, conductivity of percolation systems, geometry of random particle systems, optical or quantum devices in terms of quantum walk, algebraic descriptions of crystal dislocations and so on.
2. The generalization of Weierstrass' elliptic sigma function to more general algebraic curves are also investigated in order to apply the theory to several crucial problems in physics. Recently the behaviors of the sigma functions for the degeneration of curves are concerned. If the behaviors are clearly understood, they can be applied to the statistical mechanics of elastic curves related to the shape of DNA, and other problems, e.g., coding or cryptography.

Master/Doctor course: Education policy, curriculum, typical activity in the laboratory

Since mathematics associated industry rapidly becomes much more advanced and related to wider fields, master course students attend a seminar to study basic mathematics for the applications of mathematics, and, study their own subjects after determining their subjects.
1. You will read a textbook of mathematics and present the content in the seminar, once a week.
2. The subject is basically one of the subjects listed in the above "Research subjects." After discussion and hearing of your requests, it will be determined. There are several computational software programs which you can deal with and thus you may revise some of them.
Doctor course students, first, determine their own subject and approach before starting the studies. The goal of the study should be to find a novel result in the field, since there are several crucial mathematical problems related to engineering.

Daily life in the laboratory, etc.

The research activity in this laboratory is only to use several textbooks, notebooks, pens and a portable personal computer, since you will study mathematics in your own brain without heavy computations by means of high spec computer. It means that you can study your own subjects and mathematics at any place any time. It is very easy to proceed your own study. Of course, the preparation of the seminar is not so easy. Mathematics is sometimes very difficult but exciting. In order that you will have your motivation to study mathematics, we will show examples and pictures, in which you can imagine the advanced mathematics in engineering or industry.

Message or comments by the laboratory faculty staffs

I have been worked in Canon Inc. for twenty-seven years to study mathematical science related to electric or optical devices and materials.
The twenty first century is very exciting and recently, much more advanced mathematics and wider fields of mathematics appear to solve several crucial problems in industry. Due to the development of AI and RPA, the problem arises what matters should be done by human being besides machines.
Mathematics is one of the solutions of the problem. If you get the mathematical skills and leaned the skill to study such mathematics as an engineer, you could be a keyperson to solve several crucial problems in engineering or industry.

Laboratory mail address	Shigeki Matsutani <s-matsutani *at* se.kanazawa-u.ac.jp>