

# List of Dissertation Abstract

## (Information Media and Environment Sciences Environmental Mathematical Analysis Course)

Name	Supervisor	Title	Abstract
Hiroki YAGI	Seiya NEGAMI	Please fill in here the English title	The theme of this study is Bringing the movie to reality by interaction. This paper describes the system [Interactive Film] and [Sound Surround] that was developed based on the this theme and feeling the occurs to the viewer by the systems.
Yoshihiro ASAYAMA	Atsuhiro NAKAMOTO	Generating even triangulations on the Klein bottle	I define two reductions a 4-contradiction and a twin-contraction for even triangulation on a surface. It is well known that these reductions preserve some properties of graphs. The complete lists of minimal even triangulations for the sphere, the projective plane and the torus with respect to these reductions have already determined. In my master's thesis, I make the complete list of minimal even triangulations of the Klein bottle and prove some applications by cheking the list.
Yumiko OHNO	Seiya NEGAMI	Triad colorings of trianuglations on closed surfaces	Let $\{0, \dots, n-1\}$ be a set of $n$ colors. A coloring of a triangulation $G$ is called an $n$ -triad coloring if any adjacent vertices of $G$ get different colors and three consecutive colors appear on any face of $G$ . In this paper, we shall show that a triangulation $G$ has an $n$ -triad coloring for $n > 4$ if and only if $G$ has a 3-coloring by notions of algebraic topology. Moreover, we shall show that the coloring expanded an $n$ -triad coloring becomes a 3-coloring or an $n$ -triad coloring by changing labels of colors suitably.
Shota OGANO	Seiya NEGAMI	Automatic generation of re-embedding structures of triangulations on closed surfaces	An embedding is drawing a graph on a closed surface with no crossing edge. When does a triangulation on a closed surface have re-embeddings? In previous researches, the re-embedding structures have been classified by manpower partially. We shall create a computer program to classify the re-embedding structures automatically, and then classify the re-embedding structures of a triangulation on the Klein bottle by using it. Furthermore, we shall classify concrete structures composing the re-embeddings of a triangulation on the torus and the projective plane considering a notion called "re-embedding pairs".
Yuichiro Kawasaki	Atsuhiro Nakamoto	Generationg thorem for minor relations of quadrangulations with minimum degree at least 3 on the sphere	Let $Q_3$ be the set of quadrangulations on the sphere with minimum degree 3. Nakamoto proved that any graph $G \in Q_3$ can be reduced to the cube, only through $G \in Q_3$ by a sequence of three reductions. In my talk, we prove that every graph $G \in Q_3$ can be reduced to the cube by 13 reductions, only through $Q_3$ , preserving the minor relation of graphs, that is, in each step when we obtain a new graph $H$ from $G$ by one of the reductions, $H$ is always a minor of $G$ .

Tatuki KOBAYASHI	Atsushi NOMA	The Weierstrass points on a double cover of algebraic curves	We calculate the bases of the linear system of divisors $nP$ where $P$ is a Weierstrass point of double cover of a non-singular curve of genus 3 over the complex number field. And we give two method in the process of the calculation .
Mitsuya SATO	Atsushi NOMA	Gröbner basis of the ideal of the embedding of an elliptic curve in a projective space	It is well-known that the ideal which defines the image of an elliptic curve embedded in a projective space by the complete linear system of line bundle is generated by quadratic homogeneous polynomials. In this study, we calculated this ideal and proved that quadratic gröbner basis can be required by determining term order of them in general odd dimension cases.
Yuto SANOMA	Naoko ARIMITSU	Analysis Characteristics of Fractal Time Series and Time Series Modeling	I suggested a new method that is applied to "the Dispartion characteristics of fractional Brownian motion (fBm)" to estimate a fractal dimension of time series. I found that this new method is highly precision as a conventional " Higuchi method" and needs less time to estimate it than conventional method. A behavior of fBm is depending on a fractal dimension. I found a quantitative relation between a fractal dimension of fBm and parameters of ARIMA model. ARIMA model is one of the model of a prediction of time series . I applied this relation to forecast changes in the future, and I gained appropriate result.
Taku TOJO	Seiya NEGAMI	Distinguishing colorings of locally planar graphs with six colors	Recently, in problems of colorings of graphs, many kinds of special colorings have been studied. The distinguishing coloring is one of such special colorings. A coloring $c$ of a graph $G$ is called a distinguishing coloring if there is no color-preserving automorphism of $G$ other than identity map. In this paper, we consider distinguishing colorings of some non-planar graphs. As results of that, we construct 6-distinguishing colorings of locally planar graphs which use color 6 only for one vertex and determine the minimum number of colors required for distinguishing colorings of 4-regular quadrangulations on the torus.
Kenta TOMARU	Minoru SHIRAZAKI	CFD analysis of growth and large deformation of a soap bubble by blowing air	CFD(Computational Fluid Dynamics) analysis of growth and large deformation of a soap bubble formed by thin liquid film by blowing air has been performed. This paper mainly discusses the effect of inlet velocity and surface tension on the thin liquid film behavior. The numerical results have demonstrated mainly two things. One is that a soap bubble is oscillating while expanding although inlet velocity is constant and its oscillation depends on magnitude of inlet velocity and surface tension. The other is that variation in inlet velocity can cause larger deformation of bubble.

Asato Nakamura	Atushi Noma	Feasible Monodromy Groups of The Projective Plane Curve of Degree 4	We considered the distribution of the branch points and feasible monodromy groups of the nonsingular projective plane curve of degree 4 over the field of complex numbers. We paid attention to the combinations of numbers and the degree of branch points and examined those 19 cases. We proved feasible monodromy groups of that curve correspond with one of five groups, the symmetric group, the alternating group, and the dihedral group of degree 4, among other things.
Kouhei HARAGUCHI	Atsushi NOMA	The Galois group of $F(y)=y^{2n}-2f(z)y^n+g(z)$ .	Let $L$ be the splitting field of $F(y) = y^{2n}-2f(z)y^n+g(z)$ over the field of rational functions with one variable $z$ over the complex number field $\mathbb{C}, \mathbb{C}(z)$ . We proved the Galois group of the field extension $L/\mathbb{C}(z)$ is isomorphism to the group which has a similar operation to the semidirect product group of $\mathbb{Z}/n\mathbb{Z} \times \mathbb{Z}/n\mathbb{Z}$ and $\mathbb{Z}/2\mathbb{Z}$ .
Ryo MATSUKAWA	Atsuhiko NAKAMOTO	N-flips in triangulations with two odd degree vertices	We prove that any two triangulations $G$ and $G'$ on the sphere with exactly two odd degree vertices can be transformed into each other by two local transformations, called an N-flip and a P2-flip, if $ V(G)  =  V(G') $ . Moreover, we consider about triangulations on the projective plane with exactly two odd degree vertices.
Takanobu MURAOKA	Junji NUKATA	Coefficient of determination of the minimum absolute value method	It is a basic research on the minimum absolute value method regression analysis. In this research, we propose new indices to evaluate the fitness of linear regression model. By using this new index, it became possible to compare with the least squares model for the fit of the regression analysis. In addition, by using the minimum absolute value regression analysis in combination with this new index, it is possible to expect higher outlier detection power than when applying the conventional least squares method determination coefficient.
Yoshiro WATABE	Seiya NEGAMI	Investigation into values of mathematics in science college students	It is pointed out that there are a lot of high school students who can't find interest or motivation in mathematics learning. In order to solve this problem, some studies have been reviewed from the standpoint of teacher education. I investigate the values of mathematics in science college students from the following three points of view, "how to approach to the problem", "the structure of consciousness to mathematics" "learning motivation and learning view". The results of the investigation revealed that there are a lot of students with insufficient qualities as a mathematical teacher.