

Research Report (April, 2021- March, 2022)

Enrollment from
April 2021

Department of Department of Pure and Applied
Mathematics

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I. List of Papers

II. List of Talks

III. Research Results in AY2021

This year, I worked on what we call the integer Stokes problem in relation to the study of nonlinear partial differential equations called tt^* -Toda equations. This problem identifies all the solutions of the above equations where the amount for the Stokes matrix is an integer. As progress of this year, I succeeded in partially solving the problem by limiting it to special cases. I am currently writing a paper and aims to complete it by the end of this year.

IV. Research Plan for AY2022

The solution of the tt^* -Toda equation with the integer Stokes data described above is known to have interesting examples both physically and mathematically. (For example, it is possible to read information on quantum cohomology in projective space.) However, the question: whether all points have a "meaningful" example? has not yet been thoroughly examined. Hence it can be expected that solving the above problems will help to solve this question.

So next year, I would like to work on solving integer Stokes problem without limiting it to ρ -line. In fact, we already know that solutions corresponding to integer Stokes point on ρ -line have a "meaningful" example, so we should consider extending this problem.

On the other hand, there is also a point that it is not known whether to provide a "meaningful example" although it is a solution corresponding to integer Stokes point. I would also like to consider whether such a point has an interesting example. In addition, the research on integer Stokes point is also examined from representation theoretic viewpoint in collaboration with Yoshiki Kaneko-san. We would like to discover new aspects of the tt^* -Toda equation by combining our research results.

By tackling such research subjects, I expect that we can understand the parameter space of the solutions of the tt^* -Toda equation deeply. I would like to push forward in the next year so that we can solve as many problems as possible.