Division of Mathematical Modeling and its Mathematical Analysis

From April 1st, 2015 to March 31st, 2020

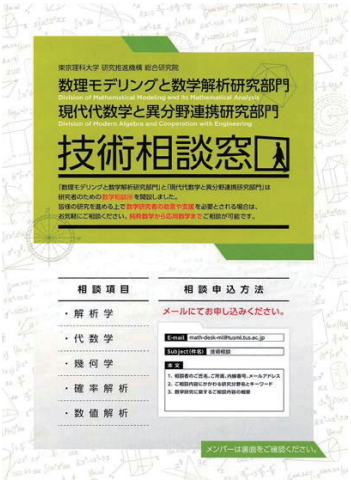
（Director）	Keiichi Kato	Dept. of Math., Faculty of Science
（Members）	Hiroshi Kaneko	Dept. of Math., Faculty of Science
	Masahito Ohta	Dept. of Math., Faculty of Science
	Tomomi Yokota	Dept. of Math., Faculty of Science
	Mieko Tanaka	Dept. of Math., Faculty of Science
	Hiromichi Ito	Dept. of Math., Faculty of Science
	Keitarou Fujie	Dept. of Math., Faculty of Science
	Masaki Kawamoto	Dept. of Math., Faculty of Science
	Taisuke Yoneyama	Dept. of Math., Faculty of Science
	Kanu Shu	Dept. of Math., Faculty of Science
	Tetsuro Nikuni	Dept. of Physics, Faculty of Science
	Kazuyuki Watanabe	Dept. of Physics, Faculty of Science
	Emiko Ishiwata	Dept. of Applied Math. , Faculty of Science
	Yoichi Enatsu	Dept. of Applied Math., Faculty of Science
	Atsuhide Ishida	Faculty of Technology
	Tohru Ikeguchi	Dept. of Information Technology, Faculty of Technology
	Atsushi Tachikawa	Dept. of Math., Faculty of Science and Technology
	Seiji Hiraba	Dept. of Math., Faculty of Science and Technology
	Masashi Aiki	Dept. of Math., Faculty of Science and Technology
	Motohiro Sobajima	Dept. of Math., Faculty of Science and Technology
	Kyouhei Wakasa	Dept. of Math., Faculty of Science and Technology

Aim

Collaboration of all members for Mathematical sciences in our Univ.

Themes

1. Models in Physics:
Application of our representation for Schrödinger eq. to Solid State Physics
2. Models in technology:
Application of theory of inverse problem For PDE to technology
3. Models in biology:
For prediction of prevalence of infectious disease



Collaboration to other divisions

・Advise on mathematical problems with the division of Modern Algebra and Cooperation with Engineering

Mail: m-model-desk-ml@tusml.tus.ac.jp

Theme1（Model in Physics）

Application to Correlation dynamics simulation of exited electrons and atoms

Simulation of models in Physics such as time dependent KS equation, GP equation

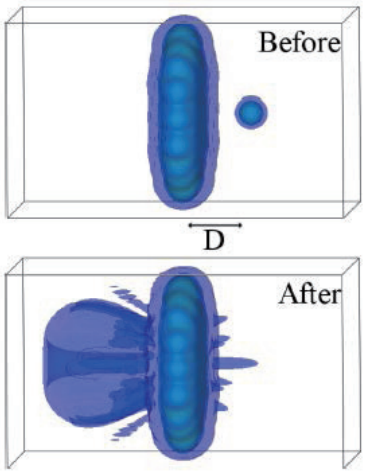
Problem: Simulation is unstable for long time

Culculation scheme of solutions via our representation of sols. to Schrödinger eqs.

K. Kato, M. Kobayashi and S. Ito, *Journal of Functional Analysis 266(2014)*, 733-753

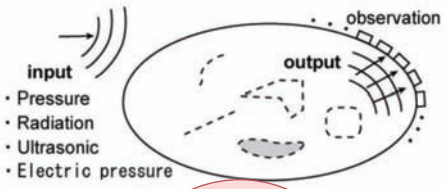
Long time stability of Simulation

Application to Solid-State Physics



Example of simulation

Theme2：Model in Technology Application of inverse problem to other fields



Inverse Problem＝Investigation of the inside by the data of the outside

Mathematical theory of Inverse problem ＋ Numerical Computation ＝ Application to Nondestructive Inspection

Theme3：Models in Biology For prediction of prevalence of infectious disease

Epidemiological models
Differential equations

Theoretical study on the models and numerical simulations

Understanding for mechanisms of disease transmission
Prediction of epidemic：will the disease be pandemic?