Research Report（April, 2020- March, 2021）

Enrollment from April 2019 | Department of Pure and Applied Physics | Kosuke KITA

I. List of Papers

II. List of Talks

1. Kosuke Kita, “On some nonlinear heat equations with nonlinear boundary conditions of radiation type”, 第 9 回非線形発展方程式セミナー@KUE, Zoom, 26 May 2020.
2. Kosuke Kita,「非線形境界条件に支配される比較定理とその応用について」, 第 7 回 Elliptic and Parabolic Zoom Seminar, Zoom, 12 Sep. 2020.
3. Kosuke Kita, “Comparison Theorem for Parabolic Equations Governed by Nonlinear Boundary Conditions and Its Applications”, International Workshop on Multiphase Flows: Analysis, Modelling and Numerics, Online(Zoom&YouTube), 1 Dec. 2020.
4. Kosuke Kita,「非線形境界条件を伴う非線形熱方程式に対する臨界現象について」, One Day Workshop 抽象発展方程式のこれまでとこれから -動的境界条件への応用を見据えて-, Kyoto, 26 Jan. 2021.

III. Research Results in AY2020

In this academic year, I devoted to the qualitative study of solutions of nonlinear parabolic equations and systems with nonlinear boundary conditions of radiation type. We prove a new comparison theorem for some initial-boundary value problem for second order nonlinear parabolic systems with nonlinear boundary conditions. Our comparison theorem would have the advantage over classical one since it enables to compare two solutions with different nonlinear boundary conditions. Moreover, applying our comparison theorem, we obtain some critical phenomena for positive solutions of nonlinear heat equations with nonlinear boundary conditions in bounded domain.

IV. Research Plan for AY2021

In AY2021, I am going to continue to study on nonlinear heat equations with nonlinear boundary conditions. Especially, I am going to consider the structural stability, the universal bounds and blow-up rate of solutions, and I will also investigate the local well-posedness and the asymptotic behaviors of some reaction diffusion equations (systems) with nonlinear boundary conditions by applying the theory developed by us in last two years.