Research Report（April, 2018 - March, 2019）

Enrollment from April 2017

Department of Pure and Applied Physics　Takanori KURODA

I. List of Papers

1. Kuroda, T.; Ôtani, M., “Initial-boundary value problems for complex Ginzburg-Landau equations governed by *p*-Laplacian in general domains,” *Libertas Mathematica (new series)*, **38** (2018) no. 2, 67-104.
2. Kuroda, T.; Ôtani, M., “Local well-posedness of the complex Ginzburg-Landau equation in bounded domains,” *Nonlinear Anal. Real World Appl.*, **45** (2019) 877-894.

II. List of Talks

1. Takanori Kuroda, “Local well-posedness of the complex Ginzburg-Landau equation in general domains based on the theory of parabolic equations,” *The 12th AIMS Conference on Dynamical Systems, Differential Equations and Application*, National Taiwan University, Taipei, Taiwan, July 6, 2018, as a finalist of Student Paper Competition.
2. ○ Takanori Kuroda & Mitsuharu Ôtani, “Global existence of the solutions for the complex Ginzburg-Landau equations with *p*-Laplacian,” *The 12th AIMS Conference on Dynamical Systems, Differential Equations and Application*, National Taiwan University, Taipei, Taiwan, July 7, 2018.
3. Takanori Kuroda, “Complex Ginzburg-Landau equations as parabolic equations,” RACMaS (Research Alliance Center for Mathematical Sciences) Lectures, *Applied Mathematics and PDEs, Part II*, Tohoku University, Sendai, Japan, January 23, 2019.
4. ○ 黒田隆徳 & 大谷光春, “Periodic solutions for complex Ginzburg-Landau equations in bounded domains,”『日本数学会 2018 年度秋季総合分科会 実函数論』, 岡山大学 津島キャンパス, 岡山, 2018 年 9 月 27 日.
5. ○ 黒田隆徳 & 大谷光春, “Finite time blow-up for a Ginzburg-Landau equation with linear term,”『日本数学会 2019 年度年会 実函数論』, 東京工業大学 大岡山キャンパス, 東京, 2019 年 3 月 20 日.
6. ○ 黒田隆徳 & 大谷光春,「有界領域上に於ける複素 Ginzburg-Landau 方程式の時間周期問題」,『第 40 回 発展方程式若手セミナー』, グリーンピア八乙, 福岡, 2018 年 8 月 30 日.
7. ○ 黒田隆徳 & 大谷光春,「複素 Ginzburg-Landau 方程式の有界領域における時間周期問題について」,『第 26 回 応用解析研究会シンポジウム』, ホテル 四季彩, 神奈川, 2019 年 3 月 12 日.

III. Research Results in AY2018

In AY2018, I continued to study the complex Ginzburg-Landau equation (CGL) mathematically. The equation (CGL) is derived as an amplitude equation corresponding to a suitable space-time scaling near a critical point from various kinds of nonlinear partial differential equation which describes behaviors of dissipative structures. Hence the well-understanding of the properties of (CGL) leads the one of behaviors near critical points of dissipative structures. In AY2018, one paper which we had submitted in last AY was published (I-1). The paper concerning the existence of global solutions of (CGL) which governed by the *p*-Laplace operator with some smoothing effects was published as well (I-2). Moreover, we studied the periodic-in-time problem of (CGL)

with decremental nonlinearities in bounded domains and reported in II-6, 7.

IV. **Research Plan for AY2019**

In AY2019, I am going to consider the periodic-in-time problem of (CGL) with decremental nonlinearities in unbounded domains and the same problem for accretive nonlinearities in bounded domains. I will also investigate the local well-posedness of (CGL) with accretive nonlinearities in interpolation spaces (classes). My next aim in this AY is to set up problems which I can tackle over this year. I plan to analyze time evolution equations with energy structures with “small” perturbations.