RIMS Kôkyûroku Bessatsu B82

Regularity and Asymptotic Analysis for Critical Cases of Partial Differential Equations

edited by Takayoshi Ogawa, Keiichi Kato, Mishio Kawashita and Masashi Misawa

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Mishio Kawashita and Masashi Misawa

Preface

The symposium titled "Regularity and Asymptotic Analysis for Critical Cases of Partial Differential Equations" was held from 29th to 31st, May 2019 at Kyoto University, Kyoto, Japan as the symposium of Research Institute for Mathematical Sciences (RIMS), Kyoto University. There were thirteen presentations on the related topics and we had more than 60 people attended at this symposium.

Mathematical analysis on the partial differential equations involves many aspects of mathematics, in particular, functional analysis, harmonic analysis, differential geometry, numerical simulation including a rigorous treatment of error estimate by numerical verifications, probability theory and so on. Among others, we concentrated a special topic related to the critical problem of partial differential equations. The critical problem typically appearing in the semi-linear partial differential equations is one of interesting problems in the theory of partial differential equations. It is related to asymptotic behaviors of solutions, regularity and singular perturbation of models and such a problem often requires a fine analysis to obtain a new aspect.

At the symposium, thirteen invited speakers gave interesting presentations of their recent results and out of them the organizing committee edited this volume as a symposium proceedings of the meeting. Ten original contributions are now contained in this volume and it is our pleasure that we publish this as a volume of the RIMS Kokyuroku Bessatsu. All the contributions are including their original results and attempt toward forthcoming results as well as the survey of related problems. The papers are covering various areas of the recent trend on partial differential equations, real and harmonic analysis related to the probability theory and mathematical physics, fluid dynamics and the verified computation. We would like to thank all the contributors to this volume as well as all the speakers and participants of symposium. We are also grateful for kind supports from the secretary staff of RIMS, Kyoto University and JSPS grant-in-aid for Scientific Research C 18K03375 (M. Misawa), A 19H00638 and S 19H05597 (T.Ogawa).

We hope that this volume presents the latest research that bring further development on the mathematical analysis of theory in the critical type partial differential equations.

Takayoshi Ogawa (Editor-in-chief)

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