

**The Hong Kong Polytechnic University
Department of Applied Mathematics**

Colloquium

The Keller-Segel system of chemotaxis, finite element method, and finite volume method

By

**Prof. Norikazu Saito
The University of Tokyo**

Abstract

The Keller-Segel system is a mathematical model to describe the aggregation of slime molds resulting from their chemotactic features. If the initial data is non-negative and does not identically vanish, the solution of the system satisfies the conservation of the positivity and the total mass. Moreover, the system processes the total free energy, which is the key property to investigate the crucial number of mass for the global existence of a solution. From the viewpoint of numerical analysis, approximate solutions should preserve these properties and have a convergence property. Actually, many works have been reported to achieve these purposes in the last decade. This lecture will summarize the results using the finite element and finite volume methods by our research group.

Bibliography

Professor Norikazu Saito received his PhD degree from Meiji University. He was Associate Professor at University of Toyama and The University of Tokyo. Currently, he is Full Professor at Graduate School of Mathematical Sciences, The University of Tokyo. Professor Saito's research interest is numerical analysis of partial differential equations, including the development of finite element methods, finite difference methods, finite volume methods, B-splines methods, domain decomposition methods, and other computational methods for solving both linear and nonlinear partial differential equations, with rigorous analysis for the stability and errors of the numerical methods. Professor Saito is the Director of Japan Society of Industrial and Applied Mathematics (SIAM), and is in the editorial board of many international journals of computational mathematics, including Numerische Mathematik, Journal of Scientific Computing, Japan Journal of Industrial and Applied Mathematics, and so on.

Date: 17 May 2021 (Monday)

Time: 15:00-16:00 (Hong Kong Standard Time GMT +8)

Venue: Online Talk via Zoom (Meeting ID: 977 9502 8329)

Speaker: Prof. Norikazu Saito, The University of Tokyo

Host: Dr. Buyang Li, The Hong Kong Polytechnic University

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