第１５５回 広島数理解析セミナー （２０１１年度）

Hiroshima Mathematical Analysis Seminar No.155

日時 ： **1月27日（金）１５：００～１７：３０**

場所 ： **広島大学理学部 Ｂ７０７ （変更の可能性あり）**

今回は２件の講演です.

１５：００～１６：００

講師 ： Julián López-Gómez 氏 （Universidad Complutense de Madrid）

題目 ： The theorem of characterization of the strong maximum principle

要旨 ： In this talk we will improve all classical maximum principles available for second order elliptic differential operators by characterizing whether, or not, they hold in terms of the positivity of the principal eigenvalue of a certain linear boundary value problem, and in terms of the existence of a positive strict supersolution. Being the number of applications of the characterization theorem huge, we will give some significant applications of interest in Spatial Ecology.

１６：３０～１７：３０

講師　：　永井　敏隆 氏 （広島大学）

題目　：　Large-time behavior of solutions to a chemotaxis model in $\mathbb{R}^2$ with critical mass

要旨　：　We consider the following Cauchy problem to a parabolic-elliptic system in $\mathbb{R}^2$:

$$\text{(KS)} \quad \begin{cases} \partial_t u = \Delta u - \nabla \cdot (u \nabla \psi), & t > 0,\ x \in \mathbb{R}^2, \\ -\Delta \psi = u, & t > 0,\ x \in \mathbb{R}^2, \\ u(0,x) = u_0(x), & x \in \mathbb{R}^2, \end{cases}$$

where ψ is given by

$$\psi(t,x) = \int_{\mathbb{R}^2} N(x-y) u(t,y)\, dy,$$
$$N(x) = \frac{1}{2\pi} \log \frac{1}{|x|} \ \text{(Newtonian potential)}.$$

This system is a simplified version of a chemotaxis model derived from the original Keller-Segel model in $\mathbb{R}^2$, and also a model of self-attracting particles in $\mathbb{R}^2$.

The total mass of the nonnegative solution u to (KS) is conserved, namely $\int_{\mathbb{R}^2} u(t,x)\, dx = \int_{\mathbb{R}^2} u_0(x)\, dx$, and the global existence and large-time behavior of the solution heavily depend on the total mass $M := \int_{\mathbb{R}^2} u_0(x)\, dx$. It is known that the nonnegative solution u converges to a radially symmetric self-similar solution as time goes to infinity in the subcritical case $M < 8\pi$, but u may blowup in finite time in the supercritical case $M > 8\pi$. In this talk, we discuss the large-time behavior of the nonnegative solution in the critical case $M = 8\pi$.

広島数理解析セミナー幹事

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