第116回

附属社会創造数学センター主催

北大MMCセミナー

Date: 2021年4月22日（木）16:30～18:00

Speaker: 王　鵬皓（京都大学）

WANG, PENG-HAO　（Kyoto University ）

Place: Online開催　　（事前登録制）

Title: Spot dynamics of a reaction-diffusion system on the surface of a torus

Abstract: The reaction-diffusion equation is a mathematical model of various chemical reactions, physics and biological phenomena. In order to understand the original phenomenon, it is important to analyze what kind of pattern the reaction-diffusion equation has and how that pattern changes. In this talk, quasi-stationary states consisting of localized spots in a reaction-diffusion system are considered on the surface of a torus with major radius R and minor radius r. Under the assumption that these localized spots persist stably, the evolution equation of the spot cores is derived analytically based on the higher-order matched asymptotic expansion with the analytic expression of the Green's function of the Laplace-Beltrami operator on the toroidal surface. Owing to the analytic representation, one can investigate the existence of equilibria with a single spot, two spots and the ring configuration where N localized spots are equally spaced along a latitudinal line with a mathematical rigor. We show that localized spots at the innermost/outermost locations of the torus are equilibria for any aspect ratio α = R/r. In addition, we find that there exists a range of the aspect ratio in which localized spots stay at a special location of the torus. The theoretical results and the linear stability of these spot equilibria are confirmed by solving the nonlinear evolution of Brusselator reaction diffusion model by numerical means. This talk is based on a joint work with Takashi Sakajo (Kyoto University).

※参加ご希望の方は、
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メールで　お名前・所属・職名・メールアドレス　をご連絡ください。
参加申込締切　2021年4月20日（火）　15時00分

RIES Hokkaido University Research Institute for Electronic Science

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