SELF-ORGANIZATION IN RANDOMLY FORCED POPULATION MODELS: STOCHASTIC SENSITIVITY TECHNIQUE

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A spatially extended stochastic population dynamics model with diffusion is considered [1]. In the parametric zone of Turing instability, the system generates a number of spatially non-homogeneous stable structures (Turing patterns). Under the effect of random noise transitions between these states may occur. It is implied that the patterns display different degrees of stochastic sensitivity: the system is expected to prefer a less sensitive pattern.

The aim of our work is to investigate preference in noise-induced transitions and its relation to stochastic sensitivity. The variance of random states surrounding a stable pattern is measured with statistical data obtained from numerical simulations. It is shown that variance can be estimated analytically using the stochastic sensitivity function technique (SSF) [2, 3]. In addition, the attraction domains of patterns are estimated and compared. Possible applications of the SSF method are discussed on examples.

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