Special Issue

Recent Studies of Stochastic Processes in Mathematical Biology

Message from the Guest Editors

Biological systems are characterized by an intrinsic noisy behaviour. This is true at each level of biological complexity, from macromolecules up to organs, apparatuses and whole complex organisms. Let us think of the neuronal system, where the major sources of noise are the randomness of the time sequence of action potentials in presynaptic neurons, the stochastic behaviour of synaptic mechanisms (synaptic noise), and the probabilistic gating of both voltage- and ligand-dependent ion channels (channel noise). In several cases, this intrinsic stochastic behaviour has been shown to enhance the detectability of weak sensorial stimuli through the stochastic resonance phenomenon. Therefore, to capture the stochastic dynamics and to realistically model such biological systems, it is necessary to make use of mathematical tools based on stochastic processes. This Special Issue focuses on stochastic processes applied to biological systems, at different complexity scales, with special regard (but not limited) to the nervous system.

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The journal *Mathematics* publishes high-quality, refereed papers that treat both pure and applied mathematics. The journal highlights articles devoted to the mathematical treatment of questions arising in physics, chemistry, biology, statistics, finance, computer science, engineering and sociology, particularly those that stress analytical/algebraic aspects and novel problems and their solutions. One of the missions of the journal is to serve mathematicians and scientists through the prompt publication of significant advances in any branch of science and technology, and to provide a forum for the discussion of new scientific developments.

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