

Distributed biomolecular systems: From computing to thinking

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Chemical reaction-diffusion media represent information processing means capable to efficiently solve problems of high computational complexity. Distributed character and complex nonlinear dynamics of chemical reactions inherent in the medium is the basis of large-scale parallelism and complex logical operations performed by the medium as primitives and equivalent to hundreds of binary fixed-point operations. Photo-sensitive catalysts controlling the dynamics (modes of functioning) of the medium enable to easily perform input of initial data and output of computational results. It was found during the last decades that chemical reaction-diffusion media can be effectively used for image processing, finding the shortest paths in a labyrinth, and solving some other problems of high computational complexity. Spatially non uniform control of the medium by physical stimuli and fabrication of multi level reaction-diffusion systems seem to be promising way enabling low cost and effective information processing devices that meet the commercial needs. Biological origin of reaction-diffusion paradigm is an effective basis for solving artificial intellect problems.

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