

Structures and chaos in chemical fronts

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The appearance of shapes and structures in nature is a mystery. Organization is a challenge to the second law of thermodynamics which states that everything in the universe tends to be uniform. However, the existence of structures, such as organisms, is a common phenomenon. These structures can only keep the thermodynamic equilibrium out. This means that, for example, biological organisms must be fed.

This research shows the emergence of forms on reaction fronts, particularly chemical fronts that are propagated in liquids and generate changes in density lead to the movement of fluid. This flow may be null, stationary, oscillating or chaotic, depending on the change in density, the type of reaction or dimensions of the system. Likewise, structures and chaos in systems in which, despite introducing a stable density gradient, are destabilized by the reaction and diffusion will be studied. Finally, the conditions for stability of fronts and the generation of spatio-temporal forms will be analyzed computationally.