

Nonlinearities, Dynamics, and Fractals

(5th Annual Meeting of ENGADYN, Grenoble, October 10–13, 1994)

About five years ago, in the fall of 1990, a first meeting of some few individuals took place at Lavin/Engadin in Switzerland. There, the idea was born to constitute a group named “ENGADYN” with the aim of intensifying an international and interdisciplinary cooperation in the field of nonlinearities, dynamics, and fractals. As a first step, delivery of annual meetings has been settled. The actual participants consist of physicists, chemists, biologists, physicians, mathematicians, and others.

The last four meetings in 1991, 1992, 1993, and 1994 all took place at Col du Cucheron near Grenoble in France, mainly organized by Joachim Peinke and Michael Klein. In 1991, the essential topics concentrated on structure formation processes in semiconductor and laser dynamics, possible generating mechanisms of fractality, and implications for turbulence phenomena. In 1992, diverse directions ranging from spatio-temporal chaos in solid state physics and reaction-diffusion biochemistry to fully developed turbulence in hydrodynamics, on one hand, just as from nowhere differentiable basin boundaries in time-discrete mappings to information-theoretical measures of complexity, on the other hand, have been addressed. In 1993, we had a selection of themes which start from bifurcation and control of higher-order chaos in coupled chemical, electronic, and semiconducting oscillators. They end with universal features as self-similarity or self-organized criticality in low-dimensional prototype model systems. Last year, the topics embraced the electric breakdown of the quantum Hall effect in two-dimensional semiconductors, autonomous oscillations as well as front propagation in chemistry, electrochemistry, and plant biology, to finally arrive at chaotic scattering, anomalous diffusion, symmetry breaking, formation of localized domain structures, and the new paradigm of endophysics based on microscopic classical chaos. The overall coherence in the motivations, the goals, and the methods of research together with the collaborative spirit which, in spite of some controversial points, were evident during the discussions at the meeting are attempted to be captured in the various contributions of the present volume.

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