



EDITORIAL NOTE

This special issue is devoted to *complex systems*, which treat *complexity* as a new scientific field. Usually, complex systems are related to real systems in physics, chemistry, biology, economics, etc, when they are characterized by collective, time-dependent phenomena emerging from the dynamic interplay of a large number of heterogeneous constituents, usually observed and analyzed in detail. It should be noted, however, that complexity is also related to structurally simple systems but having a complex dynamical behavior. This means that the concepts of complex systems and complexity also embrace intricate hard-to-understand patterns. Surprisingly, the complex systems approach is also important in exploratory studies of simple systems, where you really do not a priori know much about what is going on, and are trying to understand more. For example, whether pattern variability of a single variable is deterministic, or of stochastic nature, is not something we can easily decide. In this sense, complexity is also related to the pattern characteristics of nonlinear processes coming from low dimensional mathematical models.

In a more general mathematical framework the science of complex systems address complex adaptive systems, general networks, computational complexity and complex data mining. Therefore, any quantitative analysis to characterize complexity has to consider a broad range of approaches, from analytical methods, statistical tools and numerical simulations to multiagent problem theory which includes learning and adaptation. As one can see from this diverse framework, the field of complex systems is obviously an interdisciplinary scientific enterprise crossing over all the fundamental sciences, as well as engineering, medicine and management.

In order to bring a little on the broad subject of *complexity* to this issue, we have selected papers from the *IV Workshop on Simulation and Analysis of Complex Systems* (<http://www.lac.inpe.br/WSACS/>) which was held at São José dos Campos, São Paulo, Brazil, from 30 July-02 August 2008, as a 2008 Conference on Computational Physics (CCP) satellite meeting (<http://www.ccp2008.ufop.br/site/welcome.php>). The selected papers widely cover complex systems in physics, biology, geophysics, space science, general system theory, applied computing and engineering. Most of the selected articles were improved by a rigorous refereeing process. Therefore, the Editors thank our colleagues from the Editorial Board and other researchers who refereed these papers. We thank all authors for their contributions, which provided interdisciplinary overviews of important scientific areas.

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