



## Fractional Behavior in Nature

Guest Editor:

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### Message from the Guest Editor

Dear Colleagues,

It is already known that the non-integer order systems can describe dynamical behavior of materials and processes over vast time and frequency scales, with very concise and computable models.

1. There is evidence that most of the biological signals have spectra that do not increase or decrease by multiples of 20 dB/dec.
2. The long-range processes (1/f noise sources)—the fractional Brownian motion (fBm) is the most famous—are very common in nature.
3. The power law behaviour can be found in many peocesses.

On the other hand, and looking from a much deeper perspective, the fractional derivative implies causality. By respecting proper time order and including the effects of the past on the evolution of systems and processes, we open the door to a more realistic, non-Markovian, view of the world without drastically increasing the complexity of the system descriptions.

Prof. Dr. Manuel D. Ortigueira

*Guest Editor*

