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Title: Pseudo-differential equation with spatial p-adic variables and some their applications.

The p-adic Mathematics is widely used in the Theoretical Physics and Biology. It attracts a great interest in quantum mechanics, string theory, quantum gravity, spin-glass theory and system biology.

The concept of a hierarchical energy landscape is very important from the point of view of the description of relaxation phenomena in complex systems, in particular, spin glasses, clusters and proteins. This concept can be outlined as follows. A complex system is assumed to have a large number of metastable configurations which realize local minima on the potential energy surface. The local minima are clustered in hierarchically nested basins of minima, namely, each large basin consists of smaller basins, each of these consisting of even smaller ones, and so on. Thus we may say that the hierarchy of basins possesses ultrametric geometry and transitions between the basins determine the rearrangements of the system configuration for different time scales. Thus the key points of the concept of a hierarchical structure which is typical for p-adic world is the main advantage which can be used for the description of the complex phenomenon.

Using a p-adic interpretation of a porous medium and the hydrodynamic description of fluids we give an example of a non-Archimedean mathematical model of fluid propagating through a porous medium.