

Hydrodynamic-type model of relaxing media

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We consider a mathematical model of geophysical medium, taking into account effects of temporal nonlocality. This model was derived by G. M. Lyakhov on pure mechanical ground in late 70th of the XX century, and had been substantiated by V. A. Danylenko and co-workers a decade later within the framework of phenomenological thermodynamics of irreversible processes.

The set of travelling wave (self-similar) solutions of the modeling system is shown to possess a compacton-like solution, if an external force of specific form is

present. In contrast to the classical compactons appearing in the Rosenau-Hyman equation, the compacton appearing in the model under consideration is manifested at specific values of the parameters. In spite of such restriction, the compactly-supported travelling wave solution seems to be of interest, since it is shown to attract the near-by, not necessarily self-similar solutions. Using the numerical experiments, we show that solutions to Cauchy problems are attracted to the compacton if some energy criterion is fulfilled, regardless of the shape of initial data.