RESEARCH OF DYNAMICAL SYSTEMS BASED ON P-ADIC ANALYSIS

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At present time, research in the field of chaotic systems is great interest. In particular, this is due to the need to find chaotic attractors, many of which have practical applications [1].

At the same time, it seems relevant to use p-adic analysis to study nonlinear dynamical systems. As showed result, which obtained in [2–4], this approach is presented as quite effective. In the present work, this approach is used to simulate the processes of phase transitions of the "liquid-gas" type. Molecular structures of phases are modeled by a node – communication system. In particular, it can be a Cayley tree with a root at the phase boundary. To analyze the p-adic model, use the Hamiltonian model:

$$H = H_v + H_g \qquad (1)$$

$$H_v(\sigma) = J_v \sum_{(x,y)\in L_v} \delta_{\sigma(x_v)\sigma(y_v)}, \quad H_g(\sigma) = J_g \sum_{(x,y)\in L_g} \delta_{\sigma(x_g)\sigma(y_g)}, \qquad (2)$$

Index *v* refers to the liquid phase, index *g* refers to the gas phase, Jv, Jg are the coupling constants, the Kronecker delta, L_v, L_g characterize the geometry of the sets.

It is shown that the Gibbs energy can change abruptly from a limited value to infinity, which indicates the possibility of a phase transition and, accordingly, the breaking of bonds.

This work is supported by the Russian Scientific Foundation (grant No. 18-11-00247).

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