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Detection of chaotic behavior of the dynamical system using methods of deformable active contours

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Abstract: In this paper we consider the problem of detection chaotic behavior of the dynamical system with a special Hamiltonian structure. The numerical investigation of the phase space presented on the Poincaré sections of this system show of the cloud of points in the chaotic cases. To set the chaotic behavior of the system can be in the event of a phase portrait of a dynamical system consist closed areas of two type: circles or algebraic curve. To solve problem of detection this areas we use methods of deformable parametric models. Conformity assessment deformable parametric model shown in the image data is also produced by the energy of the model. The energy model that depends on the material parameters, the sum of the internal energy, which expresses the value of the configuration of the model limits set by the developer, and the external energy, which measures the goodness of fit model and the data in the image. The adaptation process is similar to the image pattern from the case and is to search parameter vector reaching global maximum energy model. The form of the models used for the allocation of chaotic regions, defined by a set of algebraic curves of the second, third or higher order with certain restrictions imposed on their possible configurations. In this work we developed of the model and algorithm for selection chaotic regions as algebraic curve, using the method modificated deformable active contours, and calculated scale of chaos these regions.

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