THE STUDY OF FRACTAL PROCESS DEVELOPMENT BY CHANGING THE BASIC TRIANGLE

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The geometric properties of dynamic transients in self fractal structures with geometry were studied. The homothetic transformation coefficient pattern of change in the transition from stable to chaotic structure position is displayed. Proved that the fractal dimension of the structure is subject to transitional provisions Fibonacci patterns, allowing predictably manage dynamic process.

With n = 3 in the collapse dynamic fractal structure is starting. Further development of dynamic process control can be based on affine transformations and other changes in basic triangle.

Key words: transient processes, dynamic structures, the coefficients of homothety in processes of self-organization, fractal dimension, pattern Fibonacci.

Formulation of the problem. In the study of deterministic fractal transition from stable to chaotic situation changes the structure. This transition can be described using a basic triangle fractal structure. Setting this triangle patterns change and limit values for the transitional arrangements enhances dynamic control of fractal structures and provides the ability to predict the collapse of these structures.

Analysis of recent research and publications. In [1] - [2] the laws of transient dynamic systems and their relationship with Fibonacci patterns. Established that the fractal dimension of critical points transients obey the laws of Fibonacci $z_i = z_{i-1} + z_{i-2} - 1$. In [3] shows the development of fractal objects built on Fibonacci numbers based on its dynamic properties. Investigation of the transition process in terms of its subordination to the laws of Fibonacci is a key issue for its predictable control.

Forming the purposes of Article. To investigate the dynamics of transients fractal structures on the example set properties Julie. Set basic triangle pattern changes and boundary changes that cause the transition from the stable position of the system to chaotic behavior.

Main part. Created fractal structure based on deterministic fractals can edit and modify using basic triangles corresponding object properties. Consider the structure, built on a triangle defined (Figure 1).
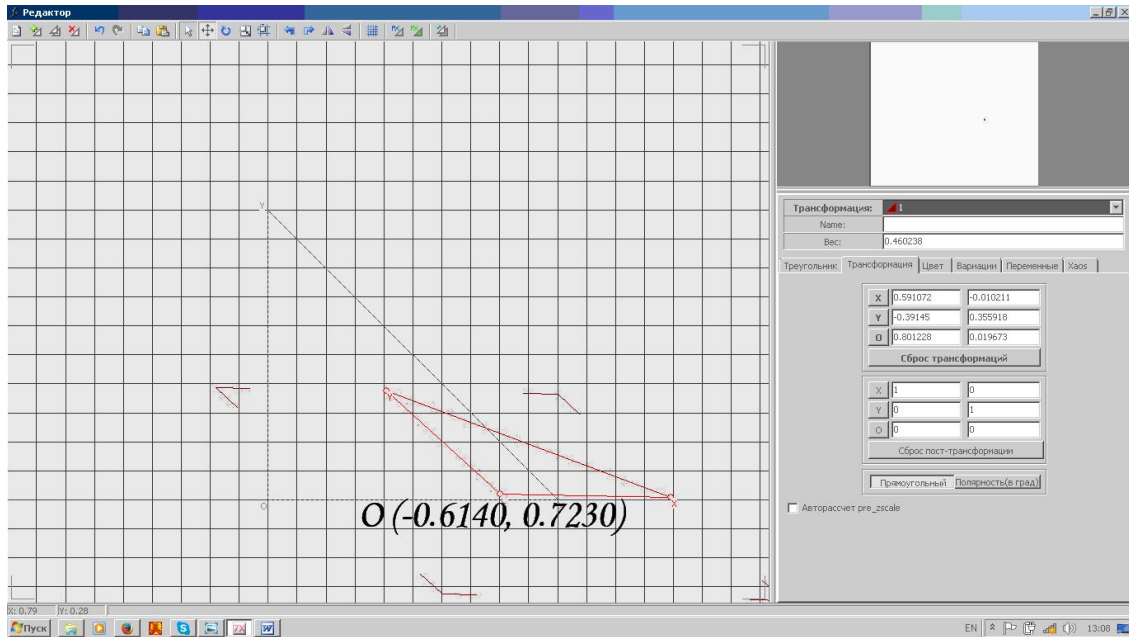
Fig. 1 is based on fractal structures defined triangle

Affinity change the basic triangle describes the different structures of dynamic processes. Suppose that the change process is subject to a triangle homothetic transformation principle. For homothetic transformation will take center vertex of the triangle O (-0.614, 0.723).

In the first stage homothetic transformation ratio $k = 0$. The specified stochastic triangle fractal sets, built on the principle of plurality Julie. The transition process in this ratio is stable. Increasing the rate to $k=-3.747$ Then there is self-similar structure (fig. 2).

When $k = -37.47$ appear bifurcation point and the system goes from stable position to deterministic chaos. When $k = -374.7$ system goes into a chaotic situation (fig. 3).

Research shows that the variation coefficient has the form $k = -0.3747 * 10n$, where n is an integer corresponding to the position of system stability. When n is greater than 3 structure turns into a chaotic situation.
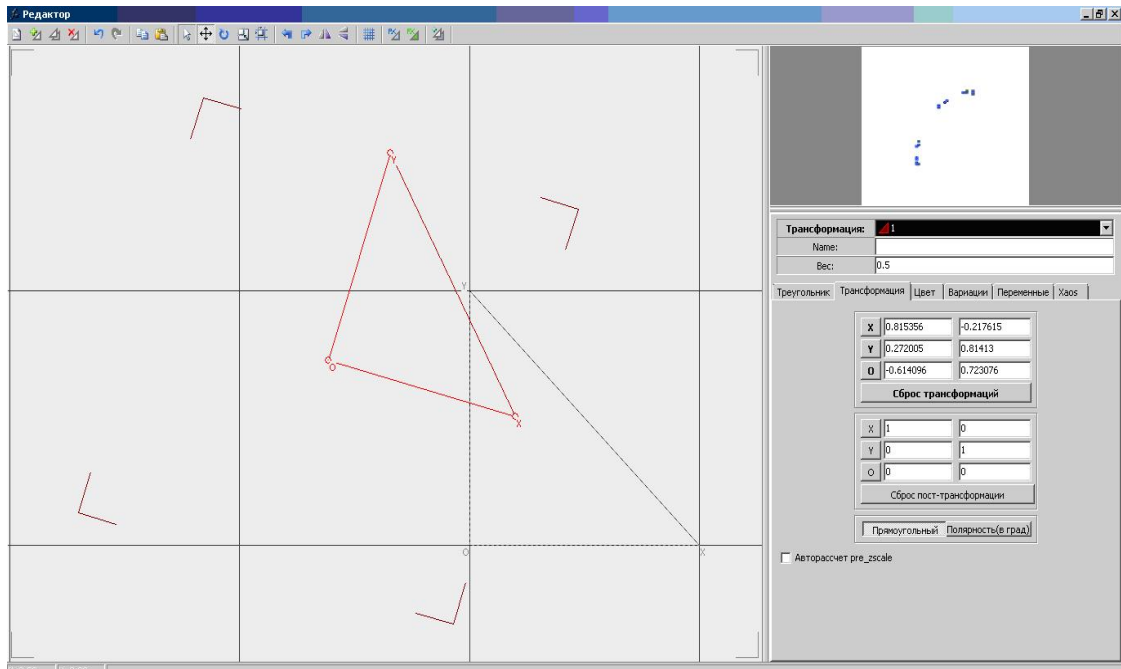
Fig. 2 self-similar structure homothetic transformation with *coefficient k =
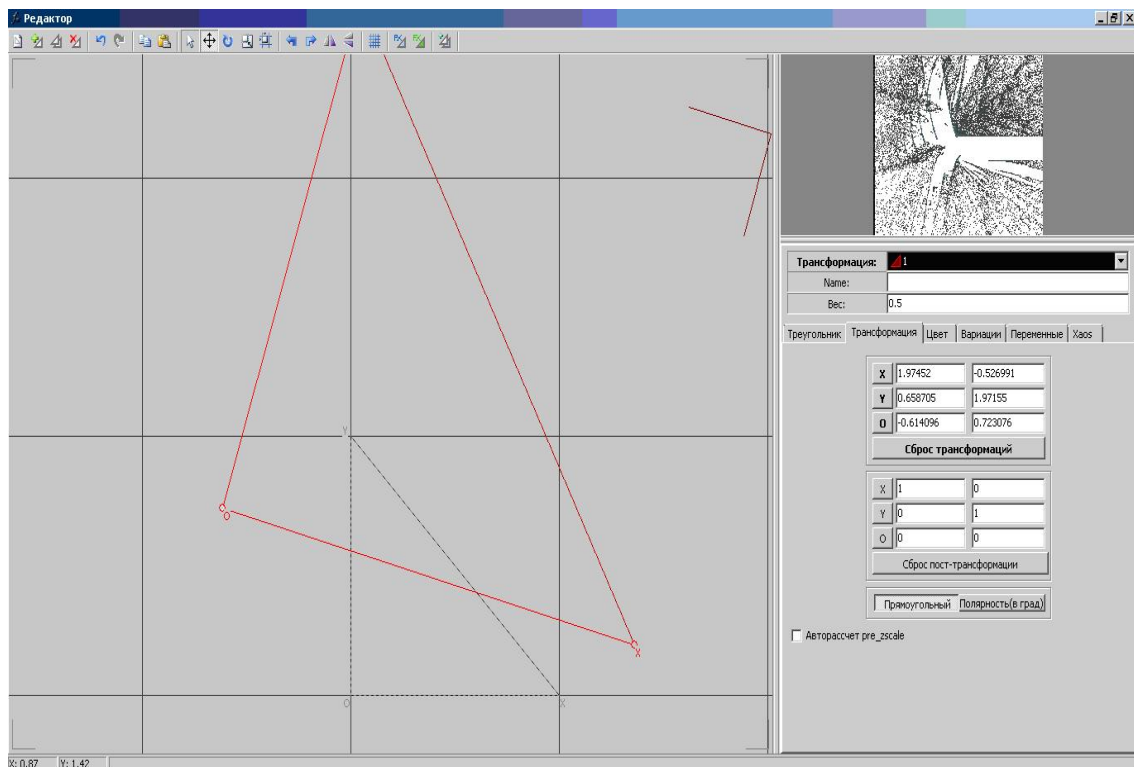-3.747*

Рис.3 Самоподібна структура з коефіцієнтом гомотетії *k=-374.7*

Thus, when *n = 3* starts during the collapse dynamic fractal structure.
Table 1 shows the relationship between the ratio homothetic
transformation, and fractal dimension of structures in these ratios.

Fractal dimension dynamic structure homothetic transformation with a coefficient $k = -0.3747 * 10n$ obeys the laws of Fibonacci $z_i = z_{i-1} + z_{i-2} - 1$.

Table 1

Fractal dimension D structure homothetic transformation with a coefficient k

k	D
-3.747	1.2
-37.47	1.32
-374.7	1.52

Conclusions. It is established that when the base of the triangle on the principle homothetic transformation process is the development of a sustainable position to chaotic. Fractal dimension is subject to transitional provisions Fibonacci patterns that allows one to manage the process.

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