$$\int_0^{\pi}(y_k^*,z_k^*)\begin{bmatrix}b_1U_k & c_1U_k\\ b_2V_k & c_2V_k\end{bmatrix}\begin{pmatrix}y_k\\ z_k\end{pmatrix}dx=(1,L_1^*)\begin{bmatrix}b_1\alpha_1 & c_1\alpha_1\\ b_1\beta_1 & c_1\beta_1\end{bmatrix}\begin{pmatrix}1\\ L_1\end{pmatrix}(k-1+O(k-1)^2).$$

Therefore we have:

$$\mathrm{Re}\lambda'(r_{kn})>0, \qquad \text{if} \quad 0<k-1\ll 1.$$

The proof of Lemma 4.1 is now completed.

From Corollary 3.4 and Lemma 3.1 we have

Theorem 4.2 The positive equilibrium (U_k,V_k) is locally asymptotically stable if $0<r<r_{k0}$, and unstable if $r>r_{k0}$.

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The Advances of the Research for Random Recursive Sets(I)

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Abstract: We introduce the probability properties of random recursive sets systematically in this paper. The main contents include convergence, zero-one law and support of distribution and self-similarity. Hutchinson constructed a class of strictly self-similar sets and got many important results on fractal properties. Graf investigated the fractal properties of a special statistically self-similar set. We have investigated various self-similar sets and their probability properties and fractal properties.

Key words: random recursive set; statistically self-similar set; Hausdorff dimension; exact measure function