LYAPUNOV EXPONENT AND SENSITIVE DEPENDENCE ON INITIAL CONDITIONS OF DUFFING MAP

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Abstract

In this work, we prove the Duffing map $F_{a,b}$, with the form $F_{a,b} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} y \\ -bx + ay - y^3 \end{pmatrix}$ has sensitive dependence on initial conditions and positive Lyapunov exponent if $|b| > 1$. Also, we study the areas which it has the positive Lyapunov exponent in another conditions on its parameters a and b at arbitrarily points. So we use Matlab program to show figures of sensitive dependence on initial conditions and to compute the Lyapunov exponent.

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Key Words : *Duffing map, Lyapunov exponent, Sensitive dependence on initial conditions.*