

# DETERMINATION OF LYAPUNOV EXPONENTS AND STUDY OF TIME-SERIES GRAPHS ON A NONLINEAR CHAOTIC MODEL

<sup>1</sup>NABAJYOTI DAS & <sup>2</sup>BASISTHA RAM BHUYAN

<sup>1</sup>Assistant Professor, Department of Mathematics, Jawaharlal Nehru College, Boko-781123, Assam, India

<sup>2</sup>Assistant Professor, Department of Mathematics, L. C. Bharali College, Guwahati, India

## ABSTRACT

In this paper, we study the chaotic model:

$$\rho(x) = ax^2 - bx$$

where  $x \in [0,4]$ ,  $a = -1$  and  $b \in [-1, -4]$  is a tunable parameter and adopt the two techniques (i) Lyapunov Exponents and (ii) Time-series Analysis, in order to confirm the periodic orbits of periods  $2^0, 2^1, 2^2 \dots$ , as the parameter varies in a suitable region and the existence of the chaotic region. Finally some enlightening results have been achieved.

**KEY WORDS:** Lyapunov exponents/ Periodic orbits / Time-series analysis/ Chaotic region

2010 AMS Classification: 37 G 15, 37 G 35, 37 C 45