

ANALYSIS OF DYNAMICAL SYSTEMS

Variant 6

Part 1: Chemical reaction (chlorine dioxide–iodine–malonic acid reaction)

Analyse 2-D system.

$$\begin{cases} \dot{x} = a - x - \frac{4xy}{1+x^2}, \\ \dot{y} = bx \left(1 - \frac{y}{1+x^2}\right), \end{cases}$$

where a and b are constants.

Parameter	Version 6.1	Version 6.2
a	10	10
b	4	2

Part 2: Lorenz-84 model

Determine whether the following 3-D system represents a strange attractor or not.

$$\begin{cases} \dot{x} = -y^2 - z^2 - ax + aF, \\ \dot{y} = xy - bxz - y + G, \\ \dot{z} = bxy + xz - z, \end{cases}$$

where a , b , F and G are constants.

Parameter	Value
a	0.25
b	4.0
F	8.0
G	1.0