Analysis of Dynamical Systems

Variant 3

Part 1: Brusselator

Analyse 2-D system.

$$\begin{cases} \dot{x} = a - x - bx + x^2 y, \\ \dot{y} = bx - x^2 y, \end{cases}$$

where a and $b > 0$ are constants.

Parameter	Version **3.1**	Version **3.2**
a	0.4	1.0
b	1.2	1.7

Part 2: Newton–Leipnik chaotic system

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

$$\begin{cases} \dot{x} = -ax + y + 10yz, \\ \dot{y} = -x - 0.4y + 5xz, \\ \dot{z} = bz - 5xy, \end{cases}$$

where a, $b > 0$ and $a = 0.4$ and $b = 0.175$.