Analysis of Dynamical Systems

Variant 12

Part 1: Lotka-Volterra equations[1] (predator–prey model)

Analyse 2-D system.

$$\begin{cases} \dot{x} = ax - xy, \\ \dot{y} = xy - by, \end{cases}$$

where a and b are constants.

Parameter	Value
a	2
b	1

Part 2: Sprott I, chaotic flow

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

$$\begin{cases} \dot{x} = -0.2y, \\ \dot{y} = x + z, \\ \dot{z} = x + y^2 - z. \end{cases}$$

[1] Some aspects of the dynamics of this system are discussed during the lectures.