Analysis of Dynamical Systems

Variant 19

Part 1: Nameless system #3

Analyse 2-D system

$$\begin{cases} \dot{x} = x - \sin(3(x-1)) - (y-1)^2 \tan(y) - 1, \\ \dot{y} = 2\sin^2(x-1) + y^2 - y^6, \end{cases}$$

where the fixed point is $(x^*, y^*) = (1, 1)$.

Part 2: Sprott H, chaotic flow

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

$$\begin{cases} \dot{x} = -y + z^2, \\ \dot{y} = x + 0.5y, \\ \dot{z} = x - z. \end{cases}$$