Analysis of Dynamical Systems

Variant 18

Part 1: Nameless system #2

Analyse 2-D system

$$\begin{cases} \dot{x} = (x+1)^2 \cos(2x) - 4\ln(y-3), \\ \dot{y} = \sin(x+1) + 2\dfrac{(y-4)^2}{y+1}, \end{cases}$$

where the fixed point is $(x^*, y^*) = (-1, 4)$.

Part 2: Sprott S, chaotic flow

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

$$\begin{cases} \dot{x} = -x - 4\,y, \\ \dot{y} = x + z^2, \\ \dot{z} = 1 + x. \end{cases}$$