

ANALYSIS OF DYNAMICAL SYSTEMS

Variant 11

Part 1: Nerve impulse action potential (Bonhoeffer-Van der Pol)

Analyse 2-D system.

$$\begin{cases} \dot{x} = x - \frac{x^3}{3} - y + f \cos(\omega t), \\ \dot{y} = c(x + a - by), \end{cases}$$

where a , b , c , f , and ω are constants.

Parameter	value
a	0.7
b	0.8
c	0.1
f	0.6
ω	1

Part 2: Sprott G, chaotic flow

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

$$\begin{cases} \dot{x} = 0.4x + z, \\ \dot{y} = xz - y, \\ \dot{z} = -x + y. \end{cases}$$