

ANALYSIS OF DYNAMICAL SYSTEMS

Variant 10

Part 1: Morse equation

Analyse 2-D system.

$$\ddot{x} + \alpha\dot{x} + \beta(1 - e^{-x})e^{-x} = f \cos(\omega t),$$

where α , β , f , and ω are constants.

Parameter	value
α	0.8
β	8
f	2.5
ω	4.171

Part 2: Sprott E, chaotic flow

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

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