

ANALYSIS OF DYNAMICAL SYSTEMS

Variant 13

Part 1: Duffing-Van der Pol oscillator

Analyse 2-D system.

$$\ddot{x} - \alpha(1 - x^2)\dot{x} - \omega_0^2 x + \beta x^3 = f \cos(\omega t),$$

where α , β , ω_0 , ω , and f are constants.

Parameter	version 13.1	version 13.1
α	2.3	2.3
β	1.0	1.0
ω_0	1.1	1.1
f	3.0	3.0
ω	1.73	6.73

Part 2: Sprott K, chaotic flow

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

$$\begin{cases} \dot{x} = xy - z, \\ \dot{y} = x - y, \\ \dot{z} = x + 0.3z. \end{cases}$$