Analysis of Dynamical Systems

Variant 5

Part 1: Duffing oscillator[1]

Analyse 2-D system.

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

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

Parameter	Version **5.1**	Version **5.2**
α	100	1
β	1	1
δ	1	0.15
ω	3.679	1.12
f	2.4	0.3

Part 2: Sprott A, chaotic flow

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

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

[1]Some aspects of the dynamics of this system are discussed during the lectures.