Analysis of Dynamical Systems

Variant 4

Part 1: Ueda oscillator

Analyse 2-D system.

$$\ddot{x} + k\dot{x} + x^3 = B\cos(\omega t),$$

where k, B, and ω are constants.

Parameter	version **4.1**	version **4.2**
k	0.05	0.05
B	7.5	12
ω	1.0	1.317

Part 2: Thomas' cyclically symmetric attractor

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

$$\begin{cases} \dot{x} = \sin(y) - bx, \\ \dot{y} = \sin(z) - by, \\ \dot{z} = \sin(x) - bz, \end{cases}$$

where b is a constant and corresponds to how dissipative the system is, and acts as a bifurcation parameter. Select $b < 0.208186$ and $b \neq 0$.