ANALYSIS OF DYNAMICAL SYSTEMS

Variant 2

Part 1: Bacterial respiration by Fairén and Velarde

Analyse 2-D system.

$$\begin{cases} \dot{x} = B - x - \dfrac{xy}{1 + Qx^2}, \\ \dot{y} = A - \dfrac{xy}{1 + Qx^2}, \end{cases}$$

where constants A, B and Q are positive.

Parameter	Version **2.1**	Version **2.2**
A	2.0	2.0
B	3.0	3.0
Q	6.5	3.5

Part 2: Lorenz attractor[1]

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

$$\begin{cases} \dot{x} = \sigma(y - x), \\ \dot{y} = rx - y - xz, \\ \dot{z} = xy - bz, \end{cases}$$

where σ, r, and b are constants.

Parameter	Value
σ	10
b	$\dfrac{8}{3} = 2.(6)$
r	28

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