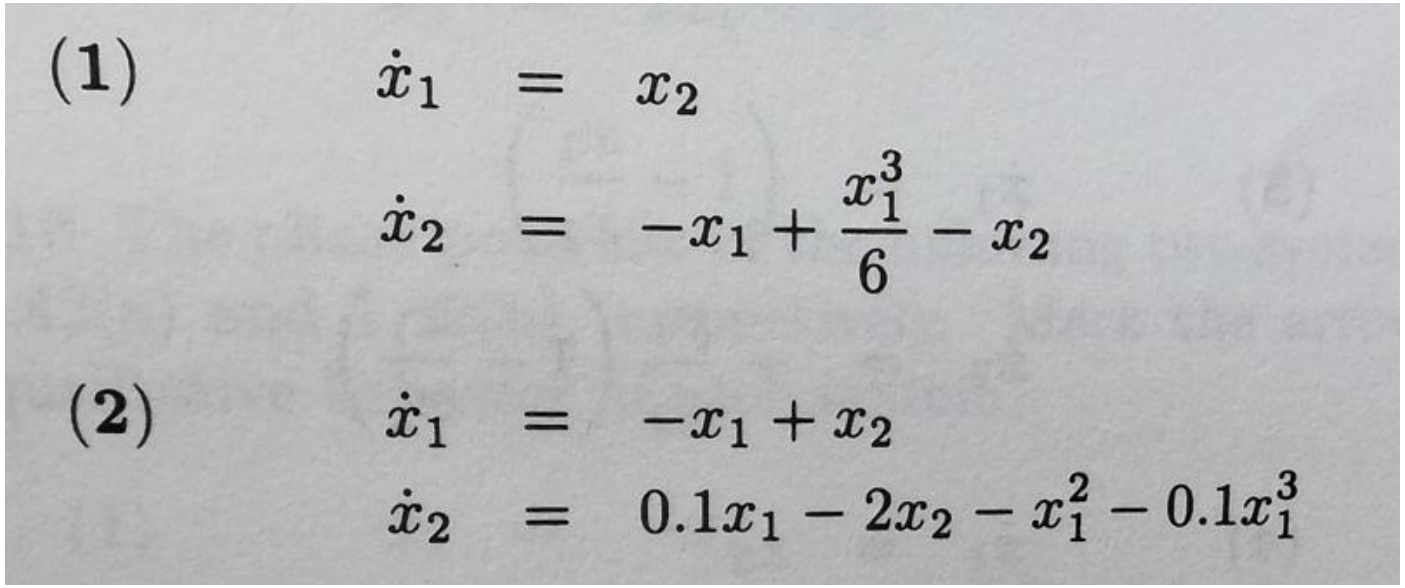
HW1: A non-linear pendulum system is described by the following equation:

a) Find the equilibrium points of the system.

b) Linearize the system around the equilibrium points.

c) Analyze the stability of the equilibrium points using the linearized system.

(Analysis using MATLAB tools)



$$(1) \qquad \dot{x}_1 = x_2$$

$$\dot{x}_2 = -x_1 + \frac{x_1^3}{6} - x_2$$

$$(2) \qquad \dot{x}_1 = -x_1 + x_2$$

$$\dot{x}_2 = 0.1x_1 - 2x_2 - x_1^2 - 0.1x_1^3$$