Home Assignment 2

Problem 1: Consider the following dynamic system:

$$\frac{d}{dt}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} x_1^2 + x_2 + u \\ e^{x_2} - 3 \end{bmatrix}$$

If the steady state value of the input is $u_s = 1$, what are the steady state values of the states, x_{1s} and x_{2s}. Linearize the system around these steady state values.

Problem 2: Consider the following dynamic system:

$$\frac{d}{dt}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} x_1 x_2^2 - x_2 + u \\ x_1^3 - x_2^2 \end{bmatrix}$$

If the steady state value of the input is $u_s = 0$, what are the steady state values of the states, x_{1s} and x_{2s}. Linearize the system around these steady state values.