e)

$$c = [-1, -1, \ldots, -1]^T$$

$$b = [f(\xi_1, u_0), f_0(\xi_1, u_1), f_0(\xi_1, u_2) \cdots f(\xi_8, u_1), f_0(\xi_8, u_2)]^T$$

$$A = \begin{bmatrix}
1 & -\alpha & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & -\alpha & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 0 & -\alpha & 0 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 & 0 & -\alpha & 0 \\
0 & 1 & 0 & 0 & -\alpha & 0 & 0 & 0 \\
0 & 1 & 0 & -\alpha & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & -\alpha & 0 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 & -\alpha & 0 & 0 \\
0 & 0 & 1 & 0 & -\alpha & 0 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & -\alpha & 0 \\
0 & 0 & 0 & 1 & 0 & 0 & 0 & -\alpha \\
0 & 0 & 0 & 1 & 0 & -\alpha & 0 & 0 \\
0 & 0 & 0 & -\alpha & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & -\alpha & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 1 & -\alpha & 0 & 0 \\
-\alpha & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & -\alpha & 0 \\
0 & 0 & 0 & 0 & 0 & 1 & 0 & -\alpha \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -\alpha \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -\alpha \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -\alpha \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -\alpha \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -\alpha \\
0 & 0 & 0 & 0 & 0 & 0 & 1 & -\alpha
\end{bmatrix} \in R^{24 \times 8}$$

f) No results have to be filled in.

Problem 2:

a)

Equilibrium: $\bar{x}^T = \begin{bmatrix} 0, & 0 \end{bmatrix}^T$

stable: ☐ yes ☒ no