EEL 4612 Homework # 3

1. Show that the following system cannot be stabilized by the control *u* =:-**Kx** for any choice of **K**

$$\begin{pmatrix} \dot{x_1} \\ x_2 \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} + \begin{pmatrix} 1 \\ 0 \end{pmatrix} u$$

2. A regulator system has a plant $\frac{Y(s)}{U(s)} = \frac{10}{(s+1)(s+2)(s+3)}$. Define state variables as $x_1 = y, x_2 = \dot{x_1},\ x_3 = \dot{x_2}$. Determine the state-feedback gain matrix to place the closed-loop poles at $s = -2 \pm j2\sqrt{3},\ s = -10$.