

KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS
DEPARTMENT OF MATHEMATICS AND STATISTICS
Math 442 Quiz 3

Name:.....ID:.....

Exercise #1 : Consider the system

$$\begin{cases} \frac{dx_1}{dt} = x_2 \\ \frac{dx_2}{dt} = -x_2 - 1 + u \end{cases}$$

Find the optimal control u which minimizes the time t_1 needed to bring the system from $x_1(0) = 10$ to $x_2(t_1) = 0$ subject to $|u| \leq 2$.