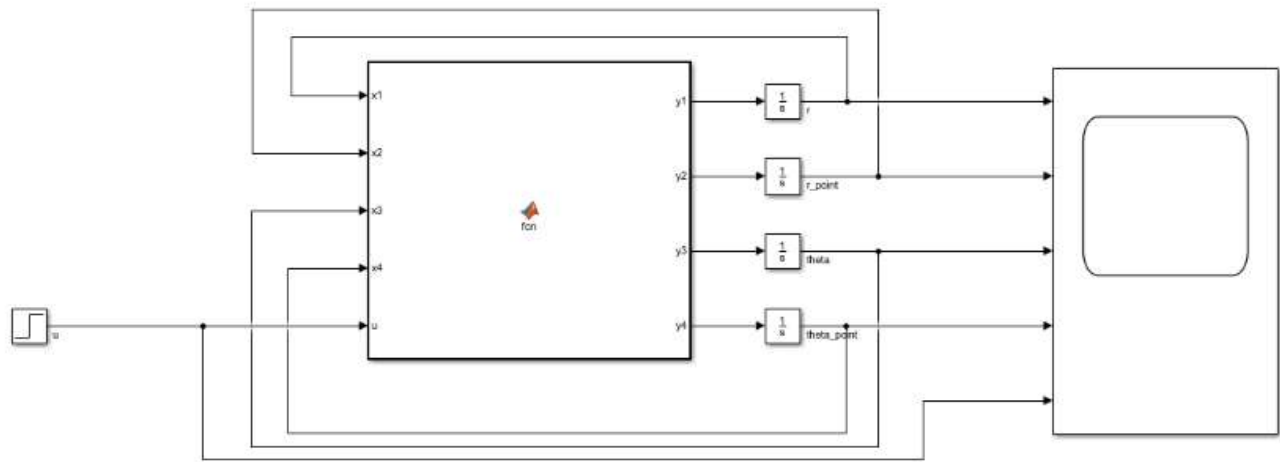
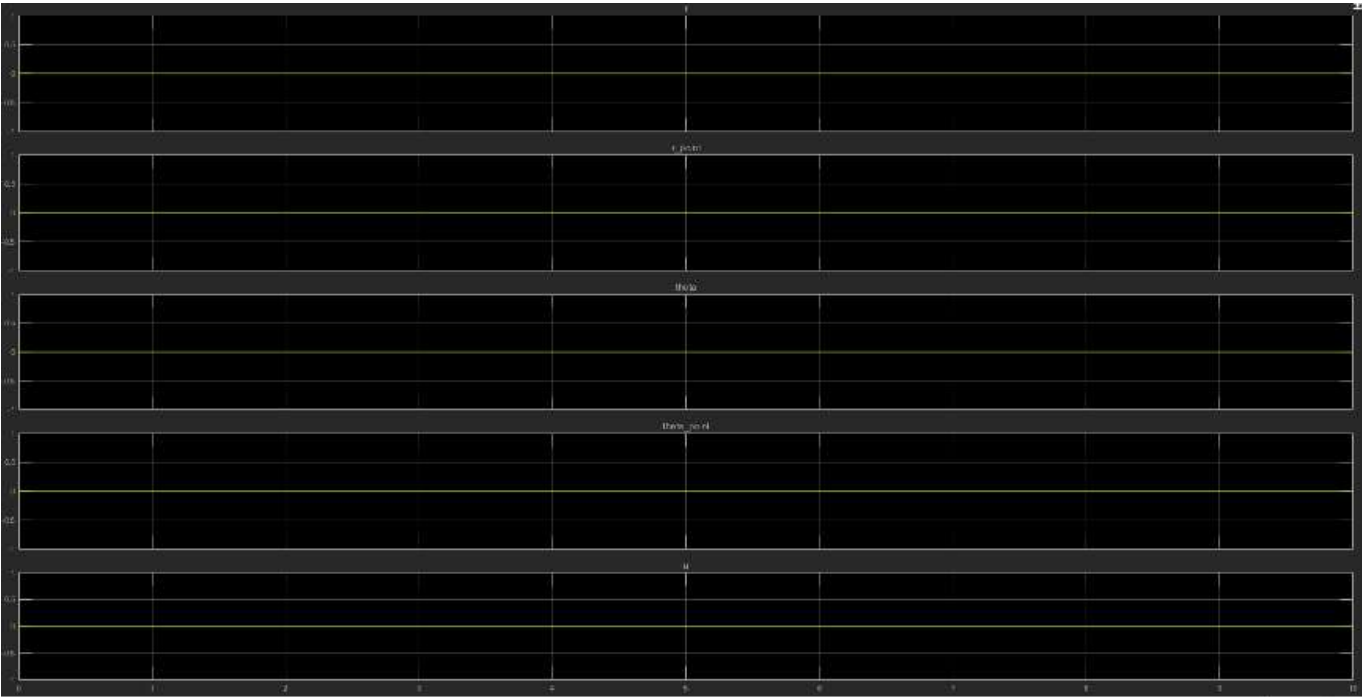


Question 5 :

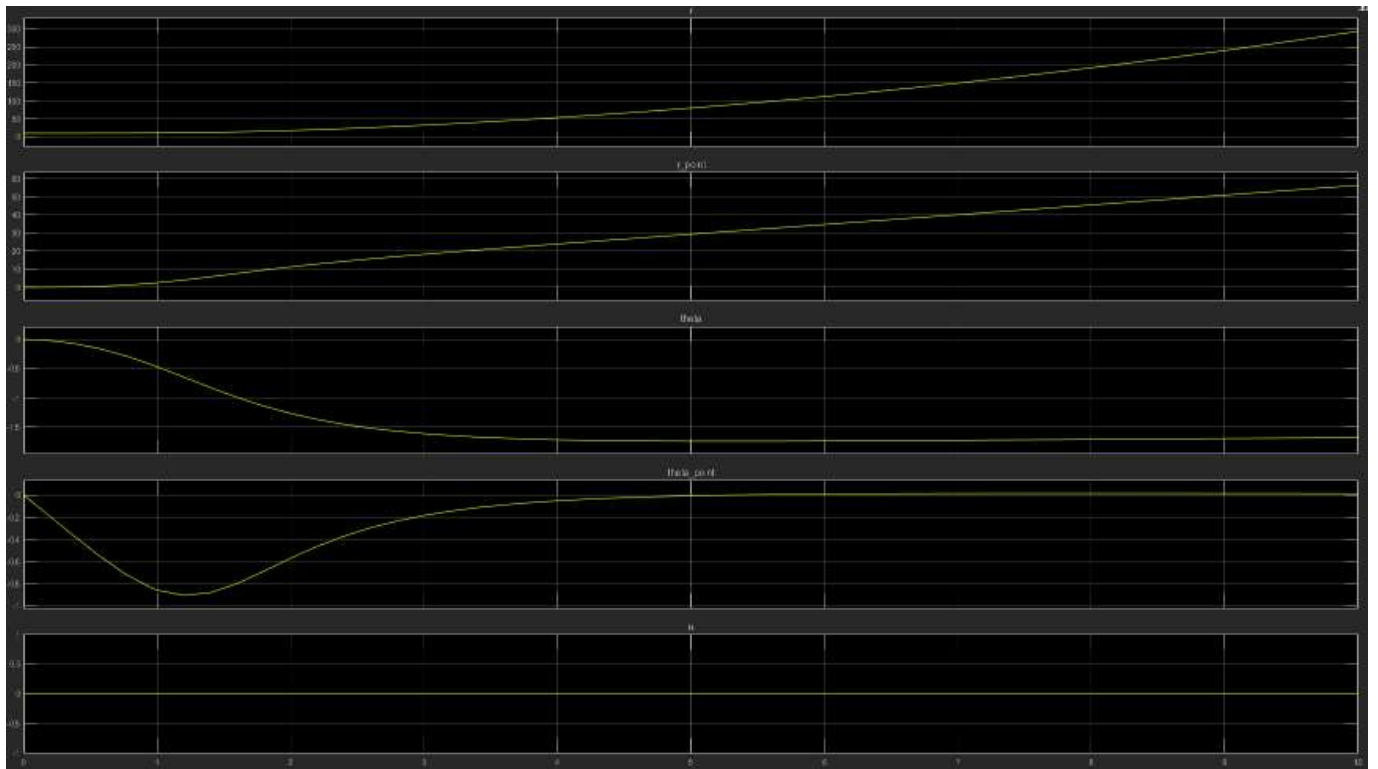


Montage en boucle ouverte

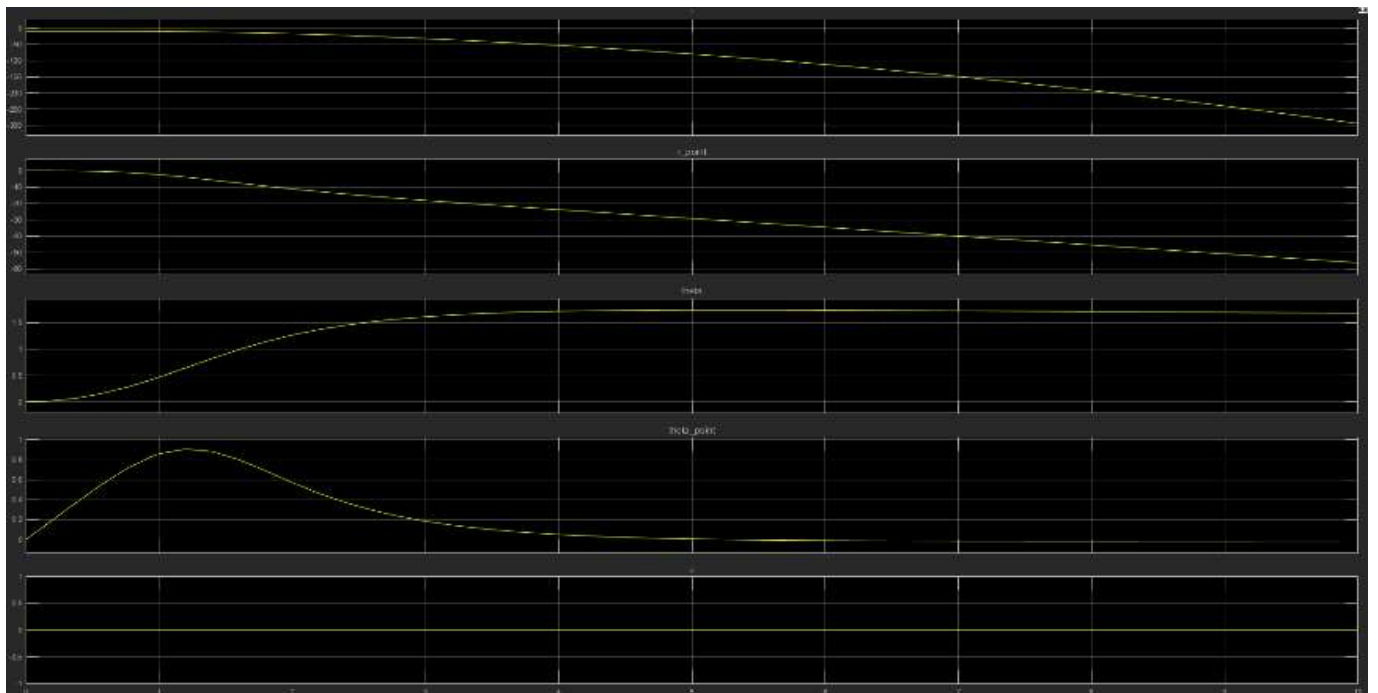
Question 6 :



$x = (0, 0, 0, 0), u = 0$

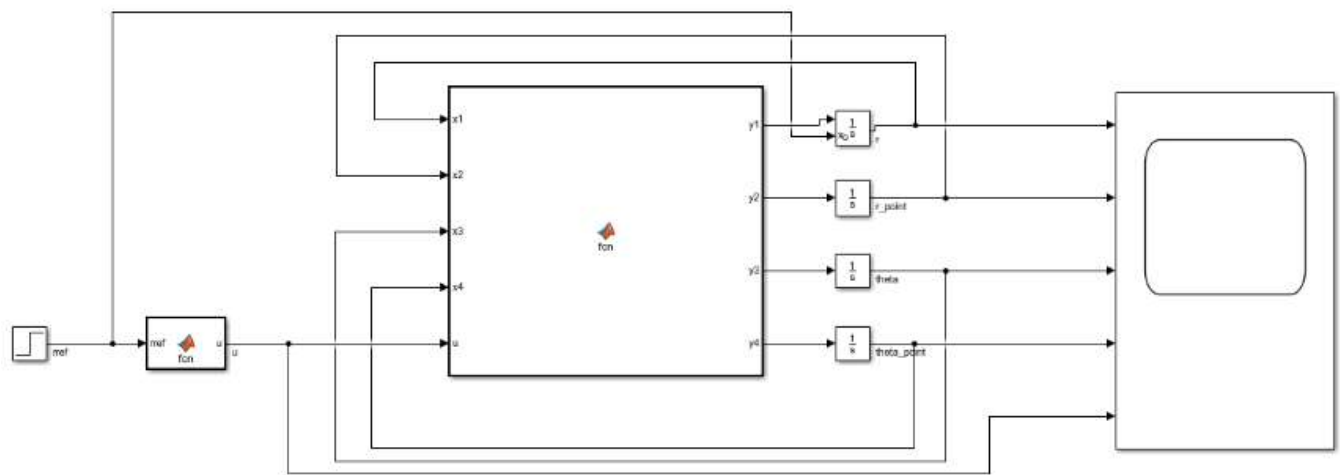


$X = (10, 0, 0, 0), u = 0$

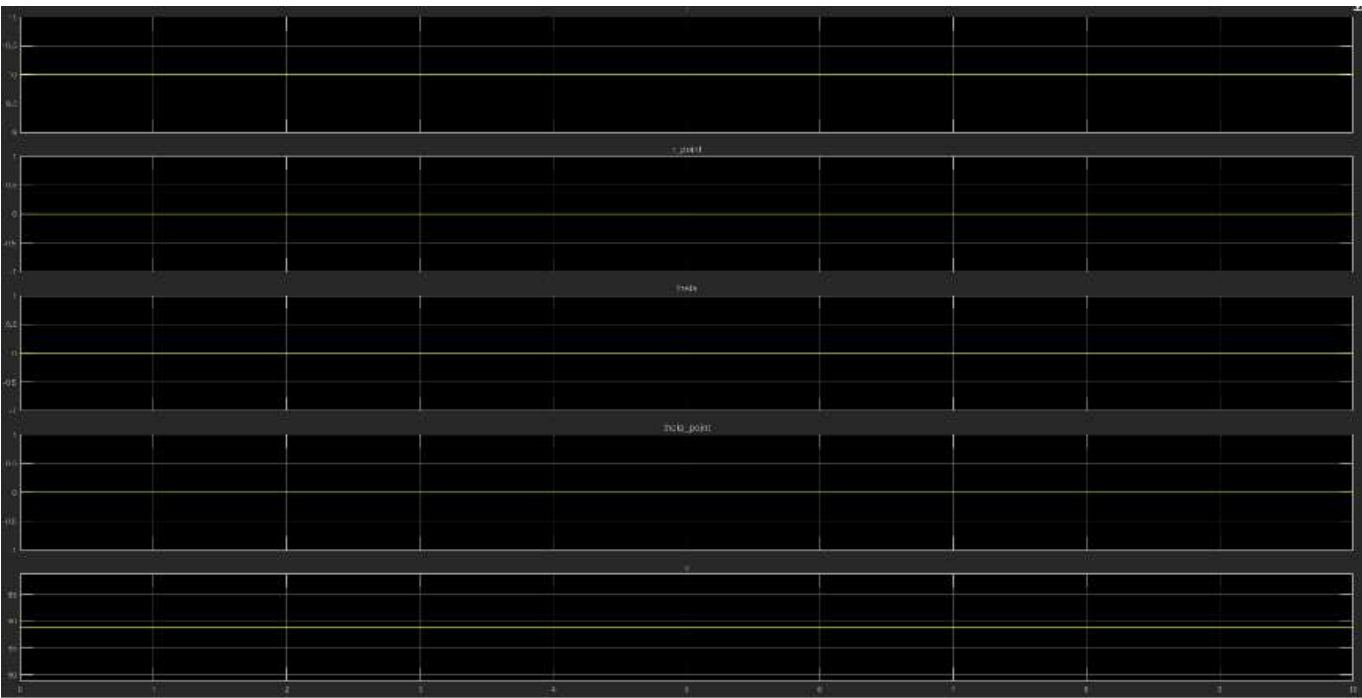


$X = (-10, 0, 0, 0), u = 0$

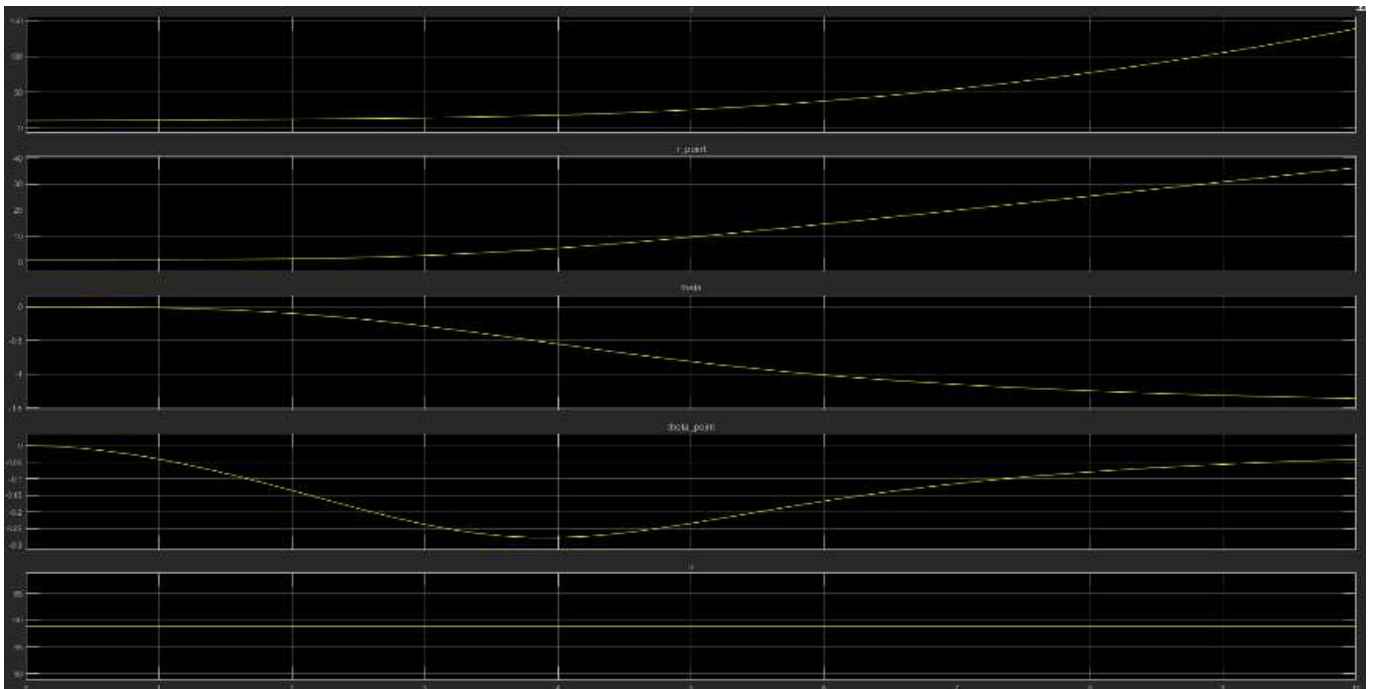
Question 8 :



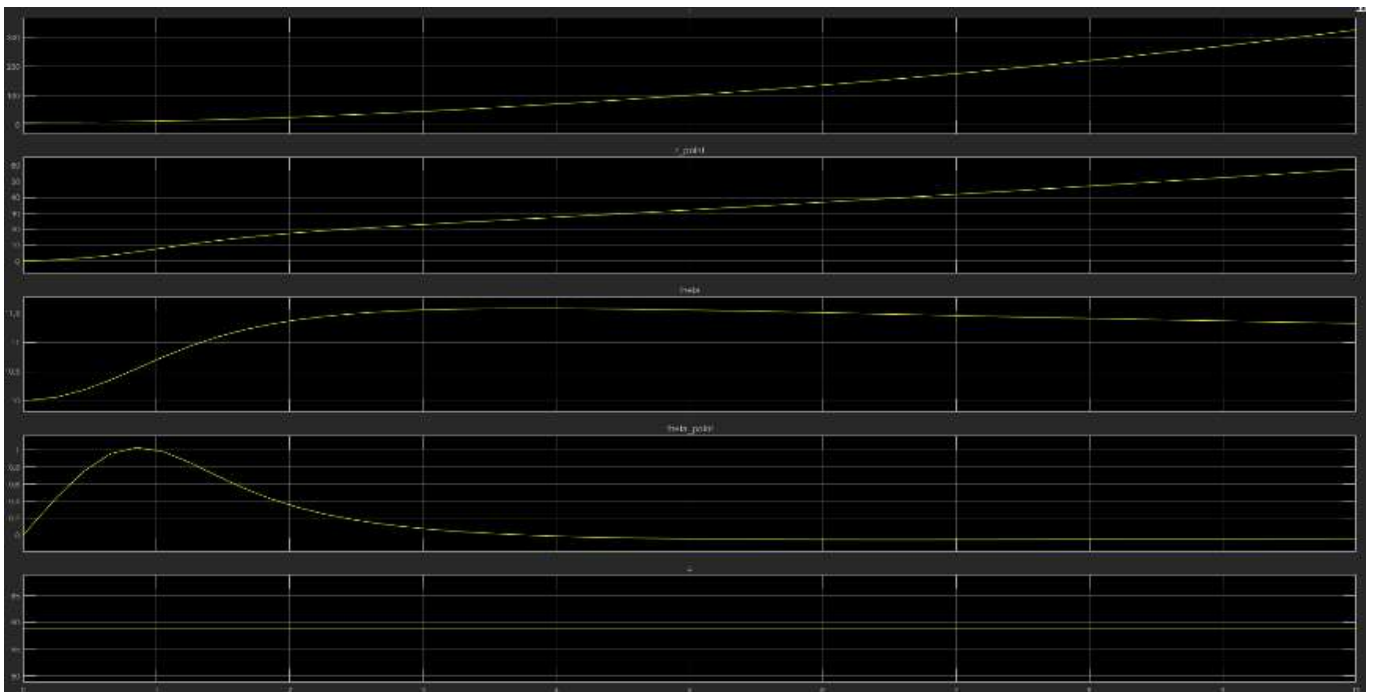
Boucle ouverte avec commande simple



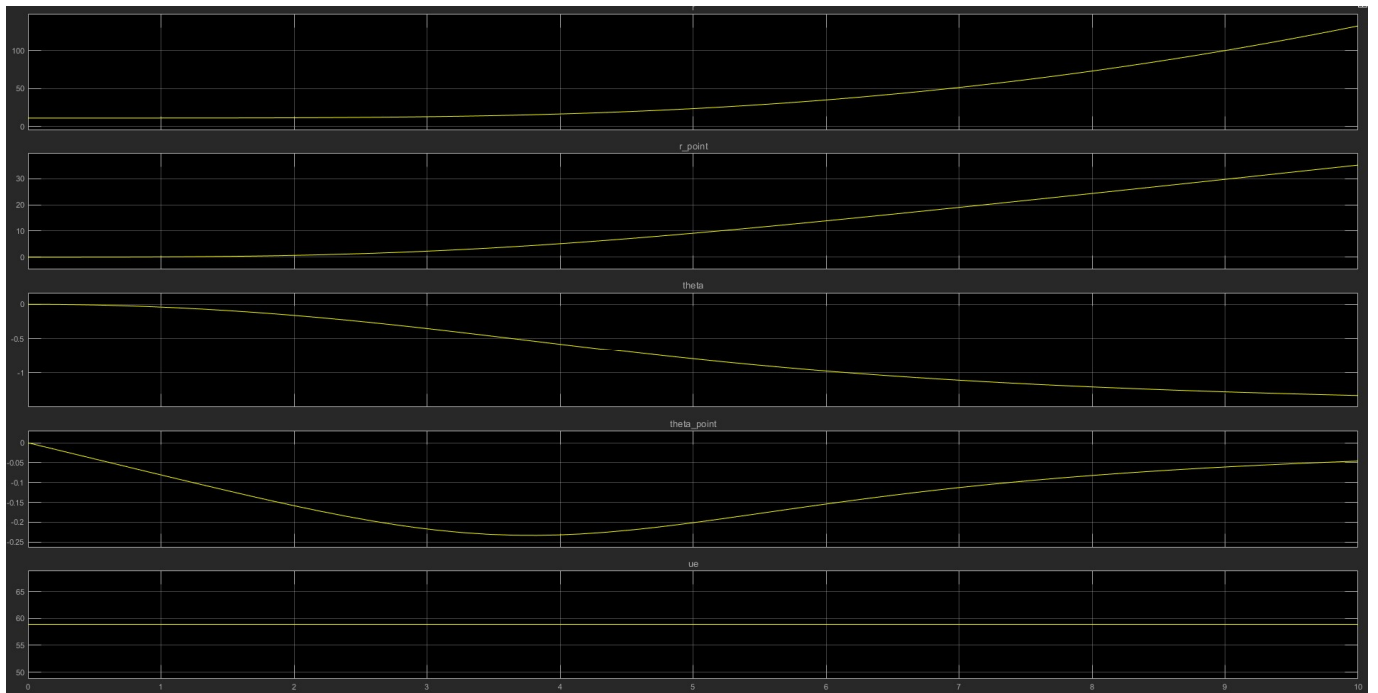
$X = (10, 0, 0, 0), R_ref = 10$



$X = (10, 2, 0, 0)$, $R_{ref} = 10$

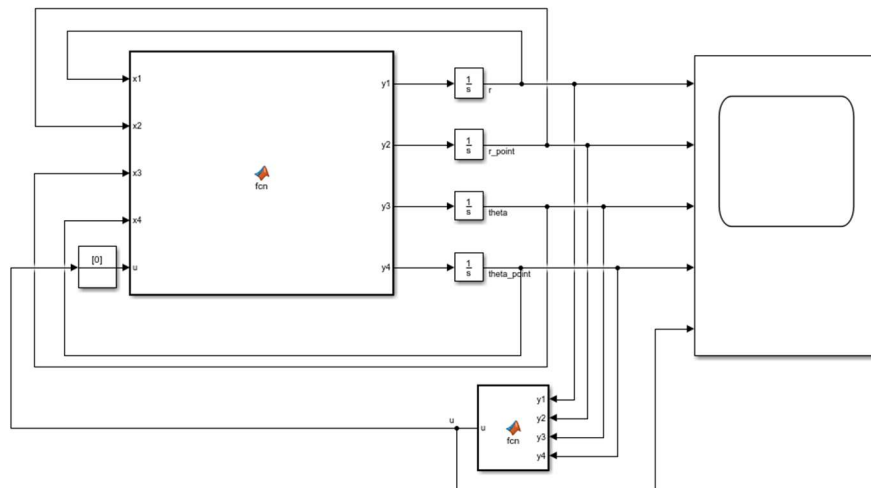


$X = (10, 0, 10, 0)$, $R_{ref} = 10$

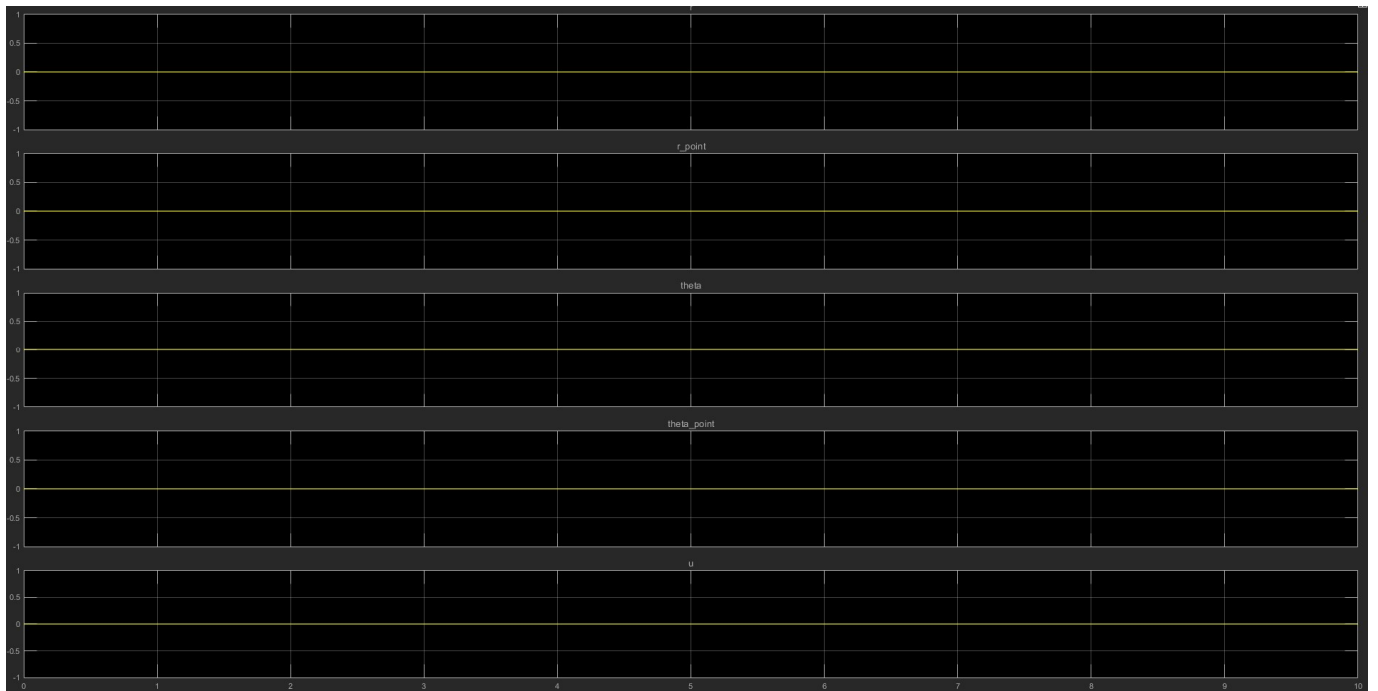


$X = (11, 0, 0, 0)$, $R_{ref} = 10$

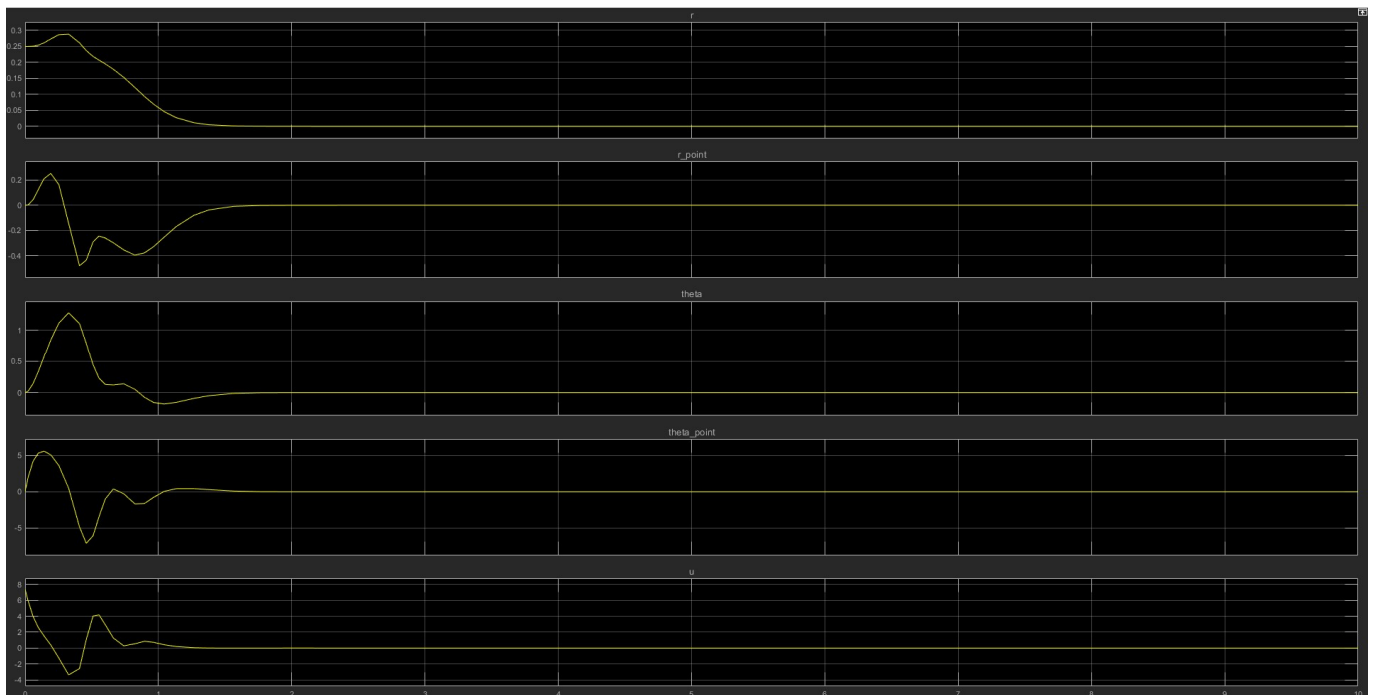
Question 13 :



Montage en boucle fermée



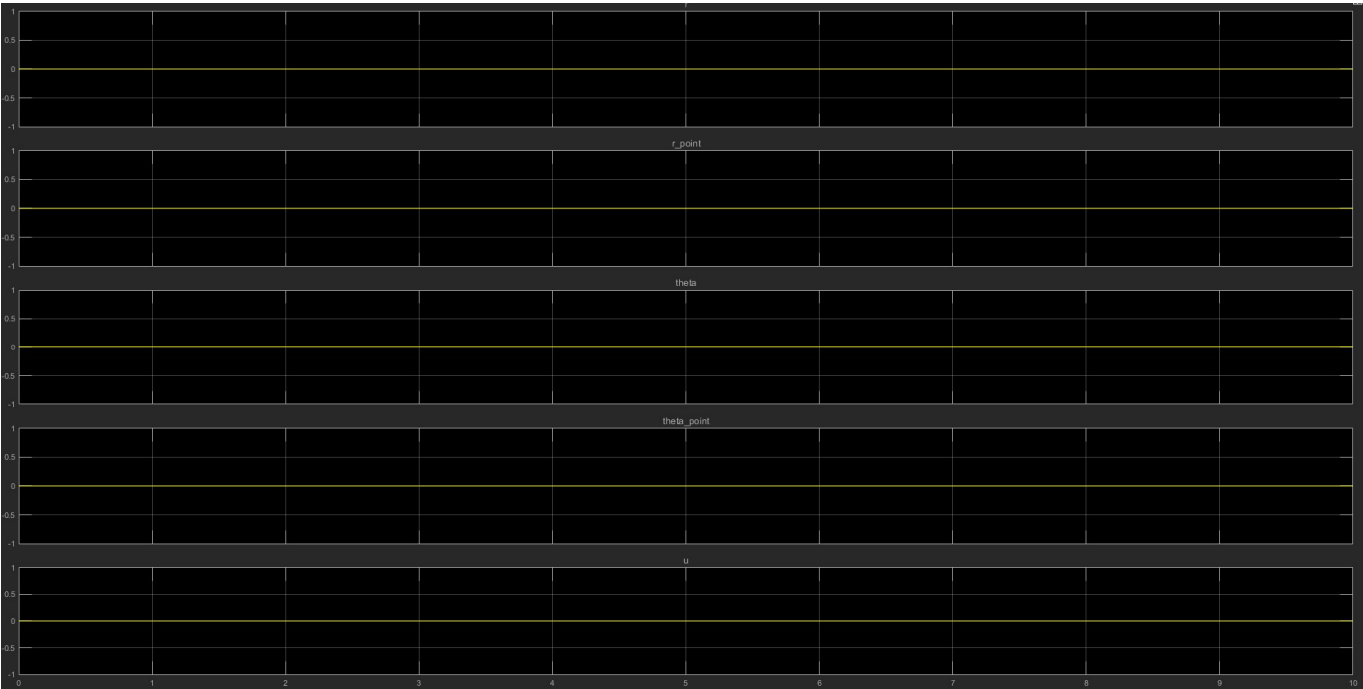
$$X = (0, 0, 0, 0)$$



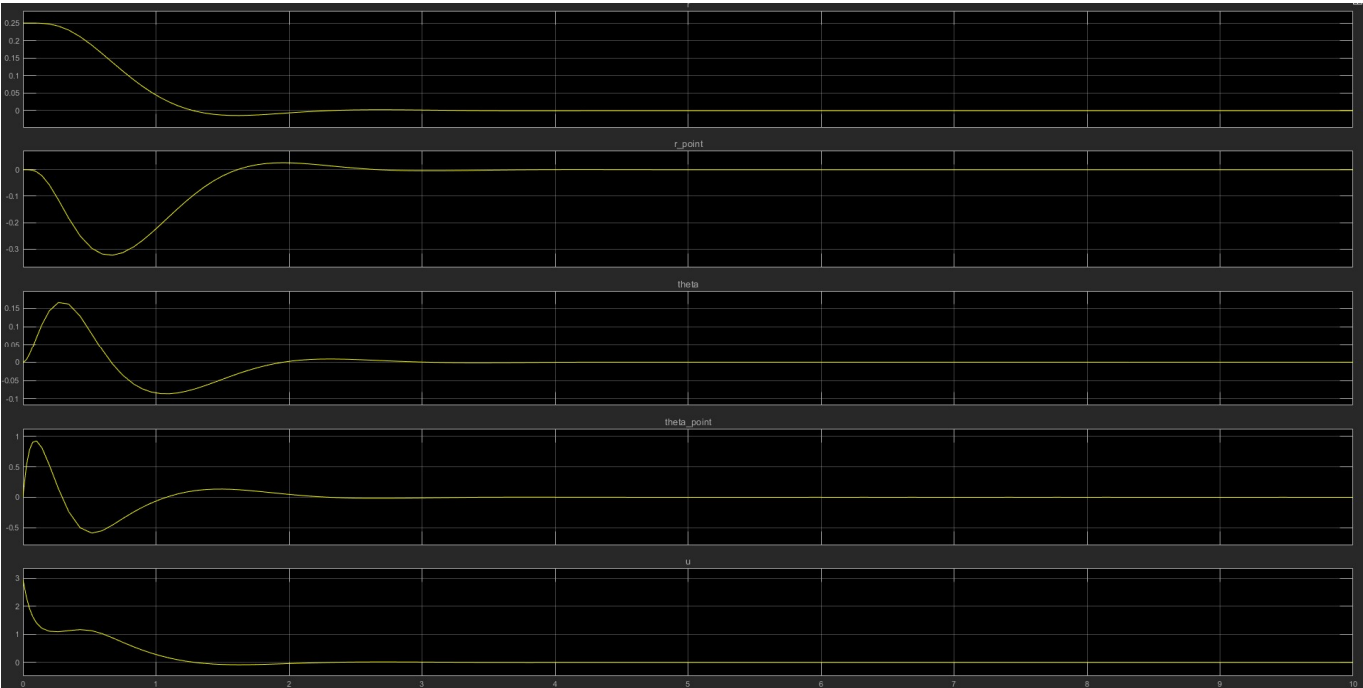
$$X = (0.25, 0, 0, 0)$$

Pour de plus grandes valeurs de $x1_init$, les courbes divergent à l'infini

Question 16 :

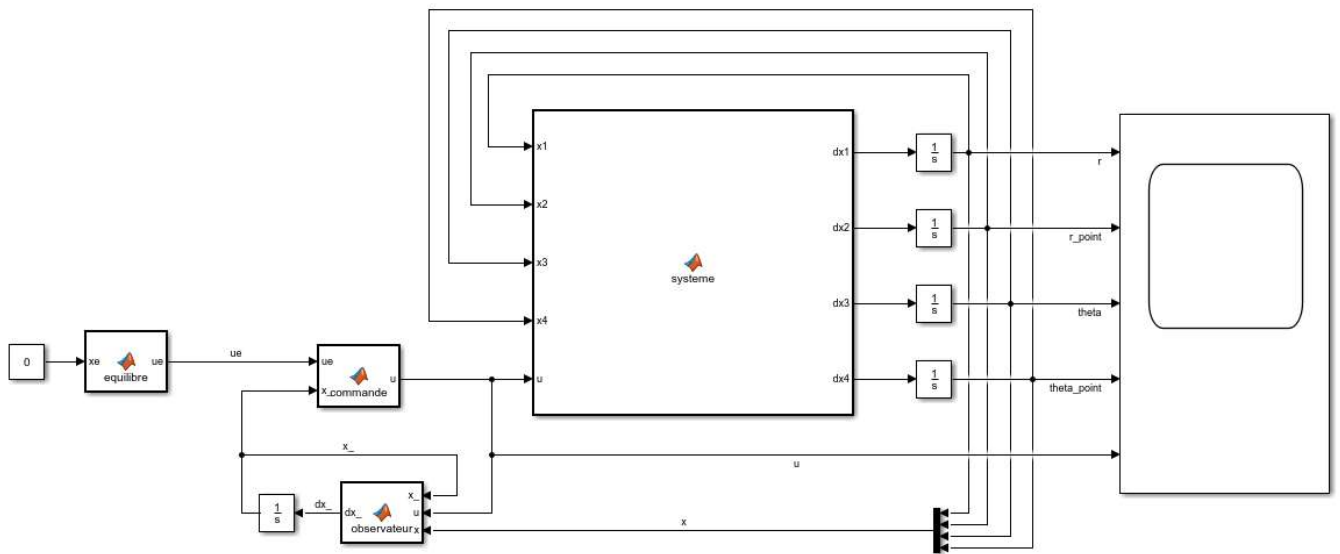


$X = (0, 0, 0, 0)$



$X = (0.25, 0, 0, 0)$

Question 22 :



Boucle fermée avec commande et observateur



$$X = (0.25, 0, 0, 0)$$