4) $\dot{x}_1 = (x_1 x_2 - 1) x_1^3 + (x_1 x_2 + x_3^2 - 1) x_1$

$\dot{x}_2 = x_3$

$\dot{x}_3 = u$

$y = h(x,u) = x_2$

$\frac{dh}{dt} = \frac{d}{dt} y_2 = \dot{x}_2 = (x_3)$) 1

$\frac{d^2 h}{dt^2} = \frac{d}{dt} x_3 = \dot{x}_3 = u$) 2

Relative Degree = 2

2)

$u = \frac{1}{L_g L_f^{r-1} h(x)} \{ -L_f^r h(x) + v \}$

$y = h(x) = x_2$ $\quad L_g = \frac{-1}{x_2}$ $\quad L_f = (x_1 + \frac{u}{x_2})$

$u = \frac{1}{1 + \frac{u}{x_2}} \{ -\frac{1}{x_2} + u + v \}$