Nonlinear Control Systems

Homework #8

(Due date: May 21, 2012)

May 15, 2012

1. Consider the following system

$$\begin{aligned} \dot{x}_1 &= x_1 + x_2, \\ \dot{x}_2 &= 3x_1^2 x_2 + x_1 + u, \\ y &= -x_1^3 + x_2 \end{aligned}$$

a) Is the system input-output linearizable?

b) If yes, transform it into the normal form and specify the region over which the transformation is valid.

c) Is the system minimum phase?

d) Is the system feedback linearizable?

e) If yes, find a feedback control law and a change of variables that linearize the state equations.