

Additional Exercises for Chapter 13

1. Consider the second-order system

$$\begin{aligned}\dot{x}_1 &= -x_1 - x_2 + \psi(x_2) \\ \dot{x}_2 &= x_1 + \psi(x_2) + u \\ y &= x_2\end{aligned}$$

where ψ is a continuously differentiable function such that $\psi(0) = 0$, $\psi'(0) = 1$, and $0 < \psi'(x_2) < 1$ for all $x_2 \neq 0$.

- (a) Is the system input-output linearizable?
- (b) Is it minimum phase?
- (c) Is it feedback linearizable?