

Math 5110: Homework Assignment 12
Due November 28, 2017

Consider the equations

$$\begin{aligned}\frac{dx}{dt} &= f(y) - \mu_1 x \\ \frac{dy}{dt} &= g(x) - \mu_2 y\end{aligned}$$

for a putative switch. Suppose that

$$g(x) = \frac{1}{1+x}.$$

a. Suppose

$$f(y) = \frac{1}{(1+y)^2}.$$

Can you find values of μ_1 and μ_2 for which this system acts as a switch? If not, prove it. If so, find one such pair of values.

b. Do the same with the subtly different function

$$f(y) = \frac{1}{1+y^2}.$$