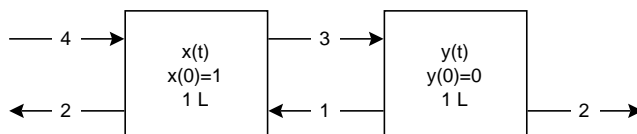


MATH 220 SAMPLE EXAM II

1. Find the *general solution* to

$$y'' + y = \frac{1}{\cos x}$$

2. Consider the mixing problem described by the figure below:



- (a) Formulate a system of equations to describe the dynamics of the amount of substance in each tank.
- (b) Solve the system in (a) using Laplace transforms.
3. Use the Laplace Transform to solve for $y(t)$:

$$y' + 3y = f(t) = \begin{cases} 0 & t < 2, \\ 6 & 2 \leq t < 4, \\ 0 & t \geq 4 \end{cases}, \quad y(0) = 0$$

4. Find $f(t)$ is

$$F(s) = \frac{s + 1}{s(s^2 + 2s + 10)}$$