

# sc4026

## Bonus Point Exercise 3

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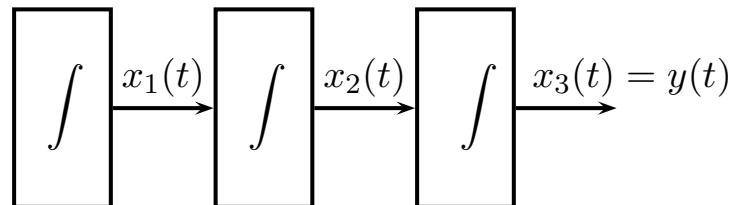
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## Observability and Observer Design

Consider an LTI system

$$\begin{aligned}\dot{x}(t) &= Ax(t) + Bu(t), & x(0) &= x_0 \in \mathbb{R}^3, \\ y(t) &= Cx(t),\end{aligned}$$

defined by the following block diagram



and having  $x(0) = [1 \ 0 \ 0]^T$ .

1. Assume you have synthesized an observer that estimates  $x(t)$ , and which is driven by  $y(t)$ .  
Let  $\hat{x}(t)$  be the states of the designed observer. Compute  $\hat{x}_1(t)$ , for  $t \rightarrow \infty$ .