

Example 3.15 (Ideal amplifier). Determine whether the system \mathcal{H} is memoryless, where

$$\mathcal{H}x(t) = Ax(t)$$

and A is a nonzero real constant.

Solution. Consider the calculation of $\mathcal{H}x(t)$ at any arbitrary point $t = t_0$. We have

$$\mathcal{H}x(t_0) = Ax(t_0).$$

Thus, $\mathcal{H}x(t_0)$ depends on $x(t)$ only for $t = t_0$. Therefore, the system is memoryless. ■

