

Example

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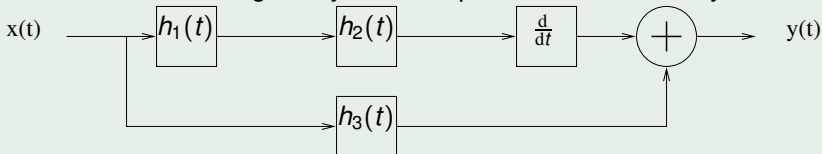
- 1 Find $u(t) * u(t)$
- 2 Find $u(t - 3) * [t^2 \delta(t - 3) - u(t + 2)]$
- 3 Find $u(t) * u(t) * (t^2 u(t))$
- 4 Find $u(t) * \delta(7 - t/3)$

(Selected from Exam 1 in Summer 2014)

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Consider the following CT system composed of LTI CT subsystems.



The impulse response functions of the subsystems are as follows:

$$h_1(t) = tu(t), \quad h_2(t) = u(t-1), \quad h_3(t) = \delta(t-3).$$

- ❶ (6 points) If this system is LTI, state so and find its overall impulse response. If it is not LTI, explain why (giving a counter example).
- ❷ (4 points) Determine the input-output relationship for the above system, (regardless of whether it is LTI or not).
(For full credit, your final answer must not contain the letter "h.")

(Selected from Exam 1 in Summer 2014)