

Date
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Q. A system is described by the differential eqⁿ,

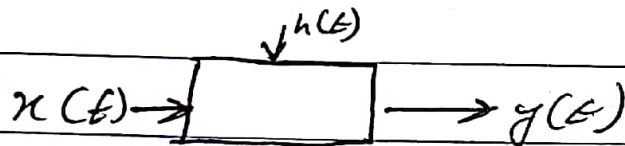
$$\frac{d^2y(t)}{dt^2} + 5 \cdot \frac{dy(t)}{dt} + 4 \cdot y(t) = x(t)$$

Determine the response of the system to an input $x(t) = e^{-2t} u(t)$ applied at $t=0$. The initial conditions are $y(0^-) = -2$ and $dy(0^-)/dt = -1$.

Solⁿ

Given,

$$\frac{d^2y(t)}{dt^2} + 5 \cdot \frac{dy(t)}{dt} + 4 \cdot y(t) = x(t)$$



$$y(t) = x(t) * h(t)$$

Also, $x(t) = e^{-2t} u(t)$ is applied at $t=0$.

Initial conditions are,

$$y(0^-) = -2 \quad \text{and} \quad dy(0^-)/dt = -1.$$