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16EC201/Signals and Systems/Unit III

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 $\frac{3}{(S+2)(S+5)} = \frac{A}{S+2} + \frac{B}{S+5}$

$$3 = A (9+5) + B (9+2)$$
Put $S = -5$

$$y = B(-3)$$

$$3 = A (3)$$

$$B = -1$$

$$Y(S) = \left(\frac{1}{S+2} - \frac{1}{S+5}\right) - \frac{2}{S+5}$$

$$Y(S) = \frac{4}{S+2} - \frac{3}{S+5}$$

$$y(S) = \frac{4}{S+2} - \frac{3}{S+5}$$

$$y(S) = \frac{e^{-2t}}{u(t)} - 3e^{-5t} u(G)$$
System Transfer Function :-
$$y(S) = x(S) * h(S)$$

$$H(S) = \frac{Y(S)}{x(S)} \rightarrow ySkem Transfer Function$$
Freq Response :-
$$By \quad substituting \quad S = Ju \quad in \quad H(S) \quad ue \ can \ get$$

$$He \quad freq \quad substituting \quad S = Ju \quad in \quad H(S) \quad ue \ can \ get$$

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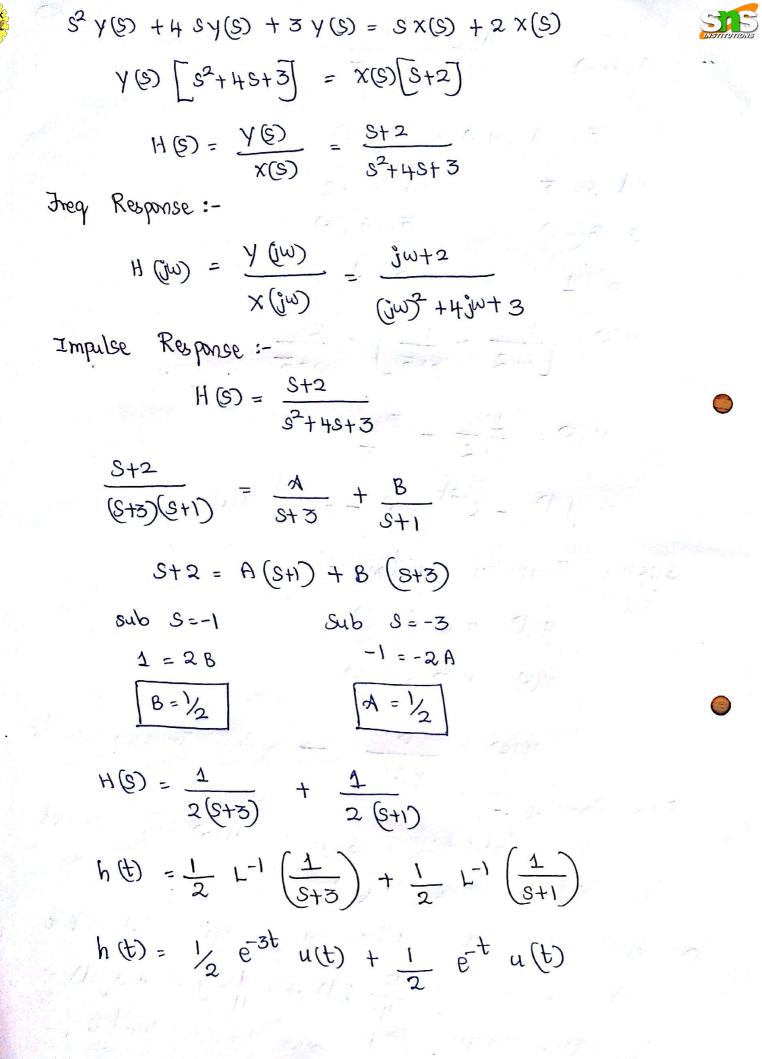
$$Substituting \quad S = Ju \quad in \quad H(S) \quad ue \ can \ get$$

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$$Jue \quad Jue \quad Jue$$

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2) The Differential equation of a system is given

$$\frac{d^{2}}{dt^{2}} y(t) + 3 \frac{d}{dt} y(t) + 2y(t) = x(t) with initial
conditions $y(0^{+}) = 3$, $y'(0^{+}) = -5$. Addemnine the olp
for the 1/p $x(t) = 2u(t)$
 $s^{2}y(s) - 5y(0^{-}) - y'(0^{-}) + 3 [sy(s) - y(0^{-})] + 2y(s) = x(s)$
 $s^{2}y(s) - 3s + 5 + 3 [sy(s) - 3] + 2y(s) = x(s)$
 $y(s) [s^{2} + 3s + 2] - 3s - 9 + 5 = x(s)$
 $y(s) [s^{2} + 3s + 2] = 2/s + [s^{5} + 4]$
 $y(s) [s^{2} + 3s + 2] = 2/s + [s^{5} + 4]$
 $y(s) = \frac{2 + 3s^{2} + 4s}{s(s(t))(s(t_{2}))} + B(s)(s(t_{2})) + c(s)(s(t_{1}))$
 $s = -1$
 $s = -2$
 $[B = -1]$
 $y(s) = \frac{1}{s} - \frac{1}{s+1} + \frac{3}{st_{2}}$
 $= t^{-1}(\frac{1}{s}) - t^{-1}(\frac{1}{s+1}) + 3t^{-1}(\frac{1}{s+2})$
 $s = y(t) = u(t) - e^{-t}u(t) + 3e^{-2t}u(t)$$$

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$$\frac{d^{2}}{dt^{2}} - y(t) - \frac{1}{dt} + y(t) - 2y(t) = x(t)$$

$$s^{2} - y(s) - sy(s) - 2y(s) = x(s)$$

$$(s^{2} - s - 2) - y(s) = x(s)$$

$$(s^{2} - s - 2) - y(s) = x(s)$$

$$\frac{y(s)}{x(s)} = \frac{1}{s^{2} - s - 2} = (\frac{1}{(s - 2)}(s + 1))$$

$$\frac{3}{s - 2} + \frac{8}{s + 1} = \frac{1}{(s - 2)(s + 1)}$$

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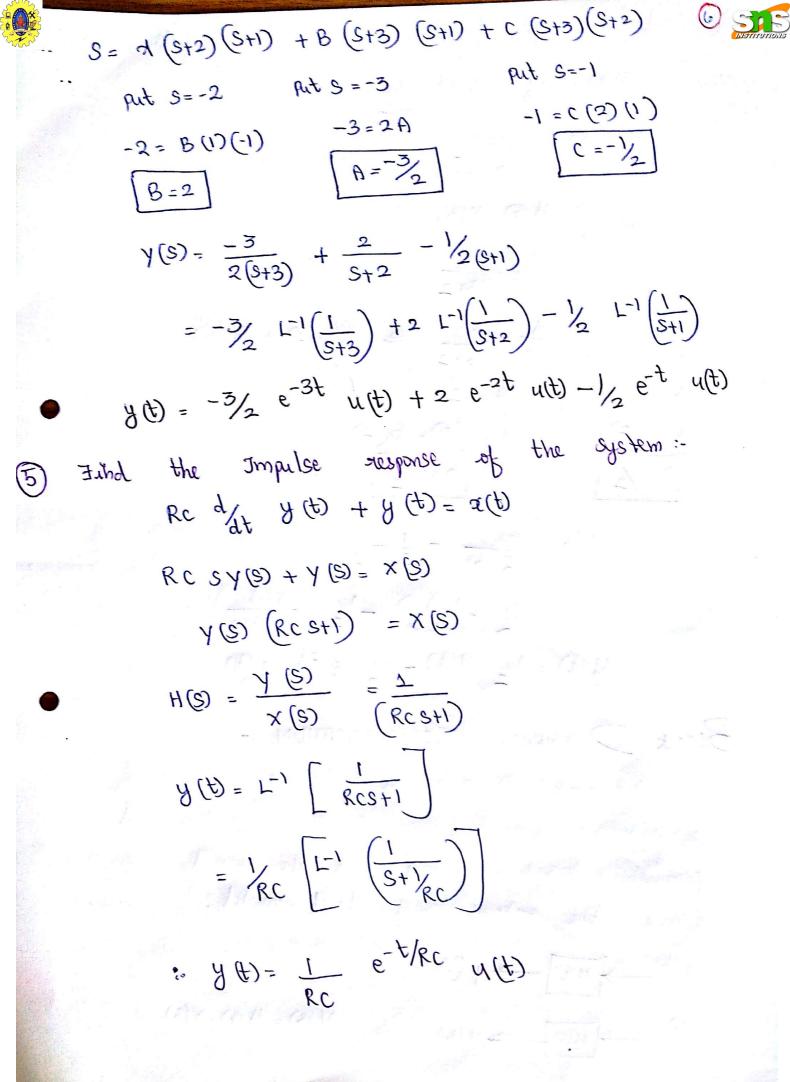
$$\frac{3}{s - 2} + \frac{8}{s + 1} = \frac{1}{(s - 2)(s + 1)}$$

$$\frac{3}{s - 1} = \frac{1}{3s - 1}$$

$$\frac{1}{(s - 1)^{2}} = \frac{1}{3(s + 1)}$$

$$\frac{1}{(s - 1)^{2}} = \frac{1}{(s - 1)^{2}} = \frac{1}{(s - 1)^{2}}$$

$$\frac{1}{(s - 1)^{2}} = \frac{1}{(s - 1)^{2}} = \frac{1}{$$



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Find the old of the system :- $h(t) = u(t), x(t) = e^{2t}$ $H(S) = \frac{1}{s} \times (S) = \frac{1}{s+2}$ $H(g) = \frac{\gamma(g)}{\chi(g)}$ Y(S)= H(S) . X(S) $= \frac{1}{8} - \frac{1}{8+2}$ $=\frac{A}{S}+\frac{B}{S+2} \Rightarrow A(S+2)+B(S)$ 0=2 S = -2 I = A(0) + B(-2)I = A(2)B =-1/2 A=1/2 $Y(s) = \frac{1}{2(s)} - \frac{1}{2(s+2)}$ $=\frac{1}{2}L^{-1}(\frac{1}{3})-\frac{1}{2}L^{-1}(\frac{1}{3+2})$ $y(t) = \frac{1}{2} u(t) - \frac{1}{2} e^{-2t} u(t)$

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