

Ex.]

$$y'' + 4y' + 3y = (2t-1)e^{2t}$$

(H)

$$y_p(t) = c_1 e^{-t} + c_2 e^{-3t}$$

$$(H)$$

First, find y_h - i.e., solve $y'' + 4y' + 3y = 0$

$$\begin{aligned} r^2 + 4r + 3 &= 0 \\ (r+3)(r+1) &= 0 \end{aligned}$$

$$r = -1, -3$$

$$c_1, c_2$$

$$e^{-t}, e^{-3t}$$

solve (H)

83



Need a proposal

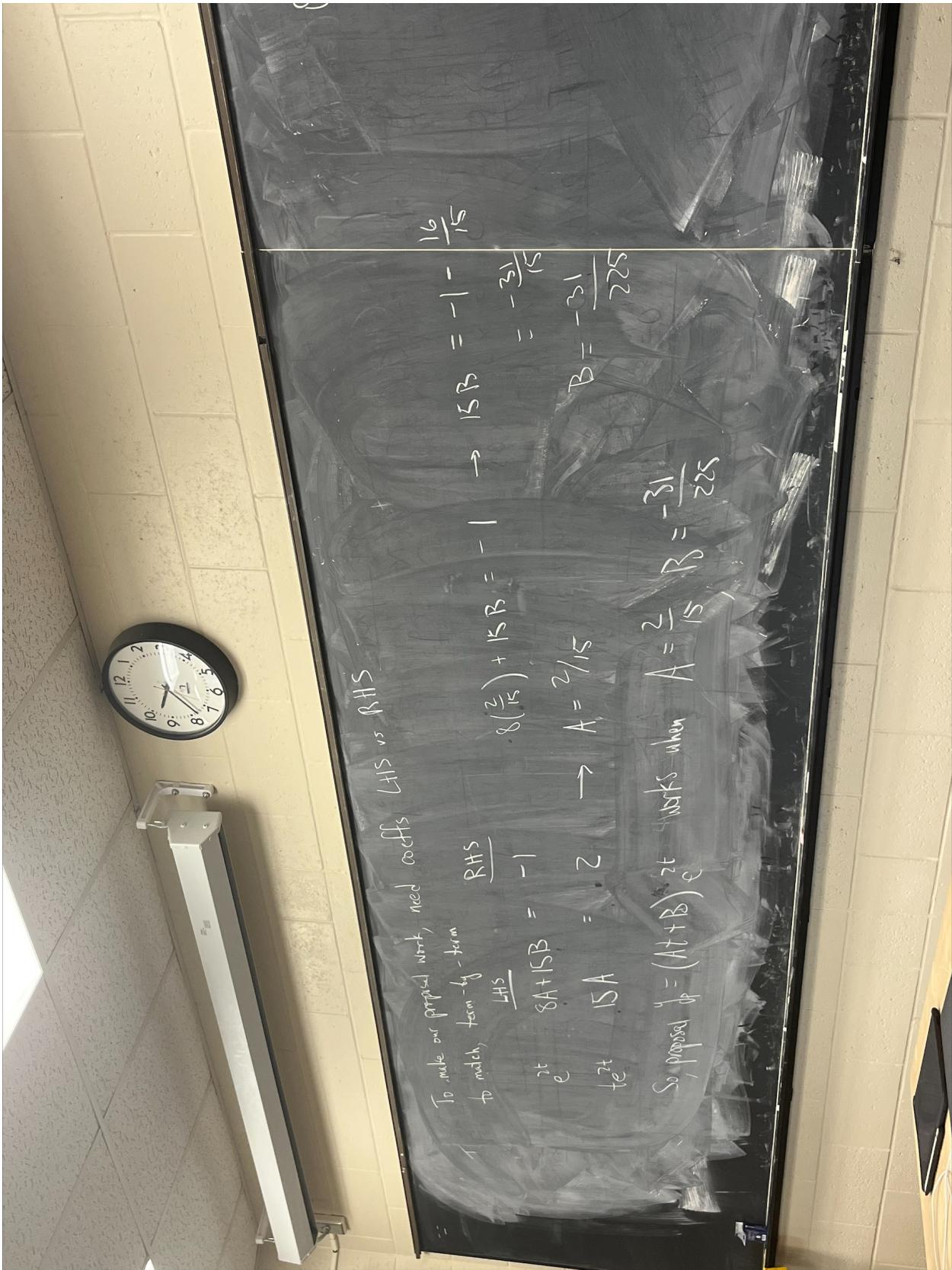
$$y(t) = (\underline{A}t + \underline{B})e^{2t}$$
$$y'(t) = \underline{A}e^{2t} + 2(\underline{A}t + \underline{B})e^{2t}$$
$$= (\underline{A} + 2\underline{B})e^{2t} + 2\underline{A}te^{2t}$$
$$y'' = 2(\underline{A} + 2\underline{B})e^{2t} + 2\underline{A}e^{2t} + 4\underline{A}te^{2t}$$
$$= (4\underline{A} + 4\underline{B})e^{2t} + 4\underline{A}te^{2t}$$

LHS of DE simplified
for method proposed

Ex.
$$\frac{(y'' + 4y' + 3y) - (2t-1)e^{2t}}{(4A+4B)e^{2t} + 4At_e^{2t}} = \frac{3(A+2B)e^{2t} + 2At_e^{2t} + 3(A+B)e^{2t}}{(4A+4B)e^{2t} + 4At_e^{2t} + 4(A+3B)e^{2t} + (4A+8B+3B)e^{2t}}$$

$$= (4A + 4B + 4A + 8B + 3B)e^{2t} = (8A + 15B)e^{2t} = (8A + 15B)e^{2t} + 15Ate^{2t}$$

RHS (target function): $2te^{-2t}$



$$\begin{aligned}
 & \text{RHS Transf} \\
 & y'' + 4y' + 3y = (2t-1)e^{2t} \\
 & \text{Proposed for } y_p \\
 & (At+B)e^{-3t} \\
 & = 2t_1 e^{-3t} \\
 & = (3t^2 + 7)e^{-3t} \\
 & \quad \text{from } y_p \\
 & At^2 + Bt + C \\
 & At^2 + Bt + C
 \end{aligned}$$

