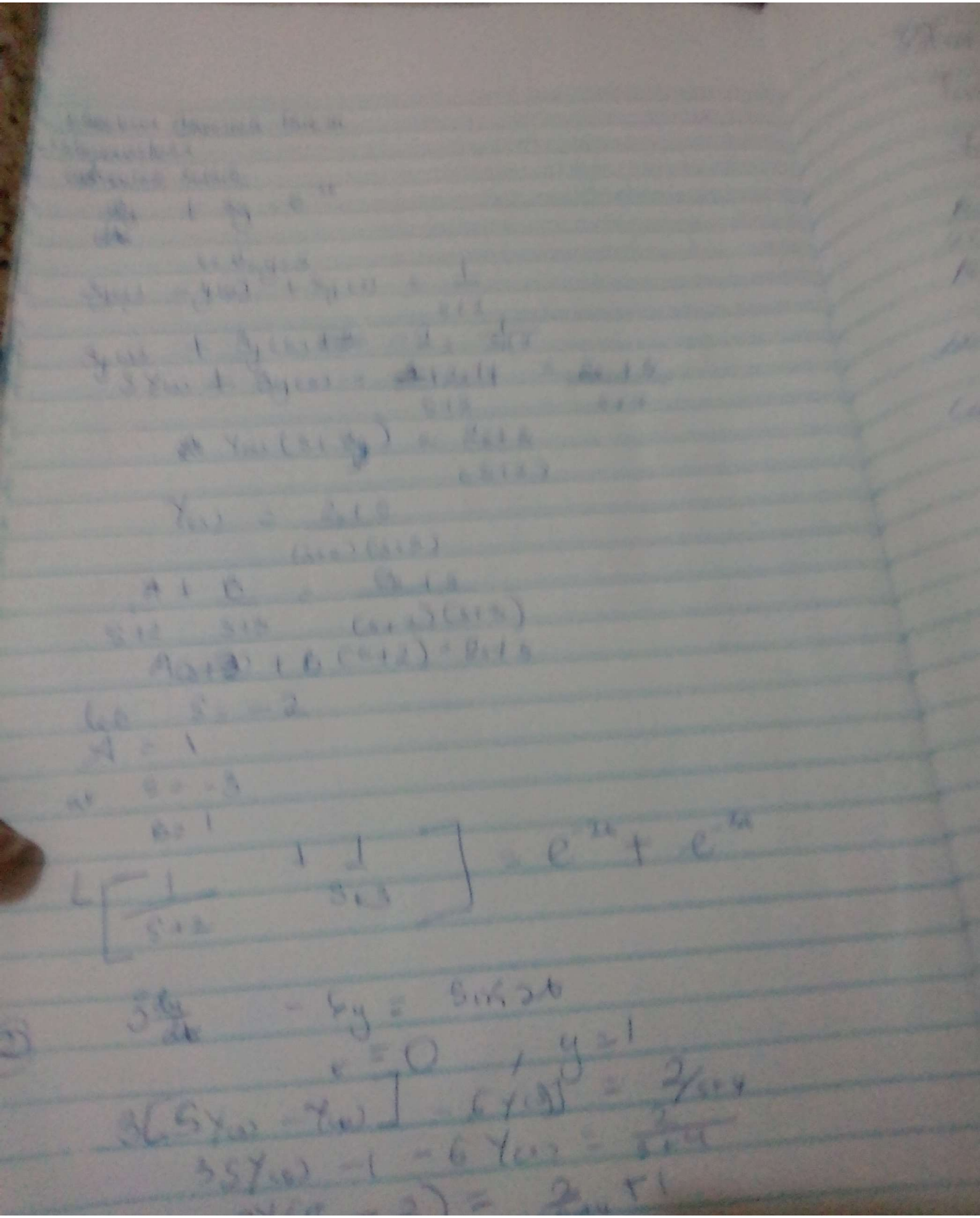

$$\frac{s+4}{s^2+4}$$

$$\frac{s+4}{(s+2)(s-2)}$$

$$\frac{A}{s+2} + \frac{B}{s-2} = \frac{s+4}{(s+2)(s-2)}$$

$$A(s-2) + B(s+2) = s+4$$

$$s = -2$$

$$-4A = 2$$

$$A = -1/4$$

Comparing the coefficients of s

$$1 = A + B$$

$$1 = -1/4 + B$$

$$B = 3/4$$

$$4 = 4A - 4C$$

$$4 = 4 \cdot (-1/4) - 4C$$

$$C = -1/4$$

$$L^{-1}\left[\frac{3/4}{s-2} + \frac{(-1/4)s - 1/2}{s^2+4}\right]$$

$$L^{-1}\left[\frac{3}{4}\cdot\frac{1}{s-2} - \frac{1}{4}\cdot\frac{s}{s^2+2^2} - \frac{1}{4}\cdot\frac{2}{s^2+2^2}\right]$$

$$= \left[\frac{3}{4}e^{2t} - \frac{1}{4}\cos 2t - \frac{1}{4}\sin 2t\right]$$

(iii) $\frac{dy}{dt} - 4y = 8$

given that $t = 0, y = 2$

$$-sy(s) - 4Y(s) = \frac{8}{s}$$

$$sY(s) - 2 - 4Y(s) = \frac{8}{s}$$

$$sY(s) - 4Y(s) = \frac{8}{s} + 2$$

$sY(s) - 4Y(s) = \frac{8+2s}{s}$

$Y(s)[s-4] = \frac{8+2s}{s}$

$Y(s) = \frac{8+2s}{s(s-4)}$

$\frac{A}{s} + \frac{B}{s-4} = \frac{8+2s}{s(s-4)}$

$A(s-4) + sB = 8+2s$

let $s=0$

$-4A = 8$

$A = -2$

let $s = +4$

$4B = 8+8$

$B = 4$

$L\left[\frac{-2}{s} + \frac{4}{s-4}\right] = -2 + 4e^{4t}$

v) $\frac{d^2y}{dt} - \frac{2dy}{dt} + 5y = e^{4t}$

$t=0, \quad y=2, \quad y'=1$

$s^2y(s) - sY(s) - y'(0) - 2(sY(s) - Y(0)) + 5Y(s) = \frac{1}{s-$

$s^2Y(s) - 2s - 1 - 2[sY(s) - 2] + 5Y(s) = \frac{1}{s-2}$

$s^2Y(s) - 2s + 3 - 2sY(s) + 5Y(s) = \frac{1}{s-2}$

$Y(s) = \frac{2s^2 - 7s + C}{(s-2)(s^2-2s+5)}$

$$\frac{A}{s-2} + \frac{Bs+C}{s^2-2s+5} = \frac{2s^2-7s+7}{(s-2)(s^2-2s+5)}$$

$$A(s^2-2s+5) + (Bs+C)(s-2) = 2s^2-7s+7$$

Let $s=2$

$$A(5) = 1$$

$$A = 1/5$$

Comparing coefficients

$$A+B = 2$$

$$B = 2 - 1/5$$

$$B = 9/5$$

$$5A - 2C = 7$$

$$1 - 2C = 7$$

$$C = -3$$

$$L\left[\frac{1/5}{s-2} + \frac{(-9/5)s+3}{s^2-2s+5}\right] = L\left[\frac{1/5}{s-2} + \frac{(-9/5)s}{s^2-2s+5} + \frac{3}{s^2-2s+5}\right]$$

$$L\left[\frac{1/5}{s-2} \cdot \frac{9/5}{(s-2)^2+1} + \frac{3}{(s-2)^2+1} \cdot 3/2\right]$$

$$L\left[\frac{1/5}{s-2} \cdot \frac{9/5}{[s-2]^2+2^2} + \frac{2}{(s-2)^2+2} \cdot 3/2\right]$$

$$= 1/5 e^{2t} \cdot \frac{9}{5} e^{2t}\cos 2t + 3/2\, e^{2t}\sin 2t$$