

2. II

$$y' = (2x+1)e^{2x} \quad \text{--- (1)}$$

$$y'' = (2x+1)(2e^{2x}) + 2e^{2x} \quad \text{--- Product Rule.}$$

Diff (1) w.r.t x

$$y'' = (2x+1) + 2y'$$

Let

$$(2x+1) = 2y' = 0$$

Let's try this

y''

$$y''(2x+1)$$

$$= 2y'$$

$$- C_2 = 0 \quad \text{--- (2)}$$

$$y^{n+1}$$

$$+ n U^{n-1} V'$$

$$(1) + n y^{n-1}(x)$$

$$+ n = - (2)$$

$$(2x+1)$$

$\Rightarrow y'' = 4y' + y''$, Hence $U'' = y^{n+1}$

$$1, U' = 2, U'' = 0$$

$$U^n V + n U^{n-1} V' + n(n-1) U^{n-2} V''$$

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$$(2x+1) + n y^n(x) + n \frac{(n-1)}{21} y^{n-2}(x)$$

$$= y^{n+1}(2x+1) + 2ny^n \quad \text{--- (4)}$$

for G_2

$$u = y, \quad u' = y', \quad \therefore u'' = y''$$

$$v = 2, \quad v' = 0$$

$$G_2 = u''v + 2v'u' - v''u = 0 + 2 \cdot 0 \cdot y' - 0 \cdot y = 0$$

$$= y''(2) + 2y'(0) - 0$$

$$= 2y'' \quad \text{--- (5)}$$

Putting eqs (4), (5), (6) in (7)

$$G_1 - G_2 - G_3 = 0$$

$$y^{n+2} - (y^{n+1}(2x+1) + 2ny^n) - 2y^n = 0$$

$$y^{n+2} - y^{n+1}(2x+1) - 2ny^n - 2y^n = 0$$

$$\Rightarrow y^{n+2} = y^{n+1}(2x+1) + 2ny^n + 2y^n$$

$$= y^{n+1}(2x+1) + 2y^n(n+1)$$