

SALAMI ABUHAFAEE 2

15/60004/054

Elect - ELECT

Eng 381

①

$$y = e^{x^2+x}$$

Soln;

$$\frac{dy}{dx} = [2x+1] e^{x^2+x}$$

$$\Rightarrow 2e^{x^2+x} + [2x+1][2x+1] e^{x^2+x}$$

$$\Rightarrow e^{x^2+x} [(2x+1)(2x+1)+2]$$

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

$$[2x+1] e^{x^2+x} [2x+1] + 2y$$

$$[2x+1] e^{x^2+x} [2x+1] + 2e^{x^2+x}$$

$$\Rightarrow e^{x^2+x} [(2x+1)(2x+1)+2]$$

$$V = y^2$$

$$V^n = y^{n+1}$$

$w_1$

$$\underbrace{y^2}_{w_1} = \underbrace{y^2 (2x+1)}_{w_2} + \underbrace{2y}_{w_3}$$

$$w_1 = w_2 + w_3$$

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

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

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

②

$$y = x^3 e^{4x}$$

$$u = e^{4x}$$

$$u^n = 4^n e^{4x}$$

$$u^{n+1} = 4^{(n+1)} e^{4x}$$

$$u^{n-2} = 4^{(n-1)} e^{4x}$$

$$V = x^3$$

$$V^{(1)} = 3x^2$$

$$V^{(2)} = 6x$$

$$V^{(3)} = 6$$

$$4^n e^{4x} x^3 + n 4^{(n-1)} e^{4x} \cdot 3x^2 + \frac{n(n-1)}{2!} 4^{(n-2)} e^{4x} \cdot 6x +$$

$$6x + \frac{n(n-1)(n-2)}{3!} 4^{n-3} e^{4x} \cdot 6$$

$$n = 3$$

$$- 4^3 e^{4x} x^3 + 5 \cdot 4^4 e^{4x} \cdot 3x^2 + 10 \cdot 4^3 e^{4x} \cdot 6x + 10 \cdot 4^2 e^{4x} \cdot 6$$

③

$$x^2 \frac{d^2 y}{dx^2} + x \frac{dy}{dx} + y = 0$$

$$x^2 y^{(2)} \Rightarrow w_1$$

$$x y^{(1)} \Rightarrow w_2$$

$$y \Rightarrow w_3$$

$$u = y^{(2)}$$

$$u^2 = y^{x+2}$$

$$u^{(k-1)} = y^{(k+1)}$$

$$y^{(n-2)} = y^{(n)}$$

$$w_1$$

$$v = x^2$$

$$v' = 2x$$

$$v'' = 2$$

$$w_2$$

$$u = y^{(1)}$$

$$u^n = y^{n+1}$$

$$u^{n-1} = y^n$$

$$v = x$$

$$v' = 1$$

$$v'' = 0$$