

$$\frac{d^2 y}{dx^2} + \frac{(1-2x)}{x} \frac{dy}{dx} + \frac{(x-1)}{x} y = e^x$$

$$y(x) = A(x) e^x + B(x) e^x \log(x)$$

WW

$$\begin{bmatrix} e^x & e^x \log(x) \\ e^x & e^x \log(x) + \frac{e^x}{x} \end{bmatrix} \begin{bmatrix} A'(x) \\ B'(x) \end{bmatrix} = \begin{bmatrix} 0 \\ e^x \end{bmatrix}$$

BB

$$y(x) = \left(\int A'(x) dx + c_1 \right) e^x + \left(\int B'(x) dx + c_2 \right) e^x \log(x)$$

$$\frac{d^3 y}{dx^3} + \frac{d^2 y}{dx^2} + \frac{dy}{dx} + y = 2e^{-x} + 5x + 6 \sin(2x)$$

$$(D^3 + D^2 + D + 1)y = 0$$

$$m^3 + m^2 + m + 1 = 0$$

$$m_1 = -1 \quad m_{2,3} = \pm i$$

$$y_1 = e^{-x} \quad y_2 = \cos(x) \quad y_3 = \sin(x)$$

$$y_{g/h} = C_1 e^{-x} + C_2 \cos(x) + C_3 \sin(x)$$

$$y_{g/h} = A(x) e^{-x} + B(x) \cos(x) + D(x) \sin(x)$$

$$\begin{bmatrix} e^{-x} & \cos(x) & \sin(x) \\ -e^{-x} & -\sin(x) & \cos(x) \\ e^{-x} & -\cos(x) & -\sin(x) \end{bmatrix} \begin{bmatrix} A'(x) \\ B'(x) \\ D'(x) \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 2e^{-x} + 5x + 6\sin(2x) \end{bmatrix}$$