

$$\exists \text{DO}(1) \text{ LCV NH.}$$

$$\frac{dy}{dx} + p(x)y = q(x)$$

$$\frac{dy}{dx} + p(x)y = 0 \quad \text{EDO}(1) \text{ LCV H}_A$$

$$\frac{dy}{dx} = -p(x)y$$

$$dy = -p(x)y \, dx$$

$$\int \frac{dy}{y} = \int -p(x) \, dx$$

$$\ln y + C_1 = \left[-\int p(x) \, dx \right] + C_2$$

$$\ln y = \left[-\int p(x) \, dx \right] + (C_2 - C_1)$$

$$y = e^{\left[-\int p(x) \, dx + (C_2 - C_1) \right]}$$

$$y = e^{C_2 - C_1} \cdot e^{-\int p(x) \, dx}$$

$$| \quad y = C e^{-\int p(x) \, dx} \quad \text{SG}(\text{EDO}(1) \text{ LCV H})$$

$$2x \frac{dy}{dx} - y = 0$$

$$\frac{dy}{dx} - \frac{1}{2x} y = 0$$

$$p(x) = -\frac{1}{2x}$$

$$-\int p(x) dx = +\frac{1}{2} \int \frac{dx}{x}$$

$$= \frac{1}{2} \ln x$$

$$y = C e^{(\ln x^{1/2})} = C x^{1/2}$$

$$y = C x^{1/2}$$

$$\boxed{y = C \sqrt{x}} \rightarrow \frac{dy}{dx} = \frac{1}{2} C x^{-1/2}$$

$$2x \frac{dy}{dx} - y = 0$$

$$\cancel{2x} \left(\cancel{\frac{1}{2}} C \frac{1}{x^{1/2}} \right) - C \sqrt{x} = 0$$

$$C \frac{x}{\sqrt{x}} - C \sqrt{x} = 0$$

$$C x \cdot x^{-1/2} - C x^{1/2} = 0$$

$$C x^{1/2} - C x^{1/2} = 0$$

$$0 = 0$$

$$\frac{dy}{dx} + p(x)y = 0$$

$$M(x, y) = p(x)y \quad \frac{\partial M}{\partial y} = p(x)$$

$$N(x, y) = 1$$

$$\frac{\partial N}{\partial x} = 0$$

$$\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$$

$$\frac{du}{u} = \left(\frac{p(x) - (0)}{1} \right) dx$$

$$\frac{du}{u} = p(x) dx$$

$$\int \frac{du}{u} = \int p(x) dx$$

$$\ln u = \int p(x) dx$$

$$u(x) = e^{\int p(x) dx}$$

$$\frac{dy}{dx} + p(x)y = 0$$

$$e^{\int p(x) dx} \frac{dy}{dx} + e^{\int p(x) dx} p(x)y = 0$$

$$e^{\int p(x) dx} y = c$$

$$y = c e^{-\int p(x) dx}$$

$$\frac{dy}{dx} + p(x)y = q(x)$$

$$e^{\int p(x)dx} \left(\frac{dy}{dx} + p(x)y \right) = e^{\int p(x)dx} q(x)$$

$$\frac{d}{dx} \left(e^{\int p(x)dx} y \right) = e^{\int p(x)dx} q(x)$$

$$\int d \left(e^{\int p(x)dx} y \right) = \int e^{\int p(x)dx} q(x) dx$$

$$e^{\int p(x)dx} y = C + \int e^{\int p(x)dx} q(x) dx$$

EDO(1) LCVNH $y(x) = C e^{-\int p(x)dx} + e^{-\int p(x)dx} \int e^{\int p(x)dx} q(x) dx$

$$y_{g/NH} = y_{g/H} + y_{\phi/q}$$

$$2x \frac{dy}{dx} - y = 3x^2 \quad \text{EDO(1) LCV NH.}$$

$$\frac{dy}{dx} - \frac{y}{2x} = \frac{3x^2}{2x}$$

$$\frac{dy}{dx} - \frac{y}{2x} = \frac{3}{2}x \quad p(x) = -\frac{1}{2x}$$

$$q(x) = \frac{3}{2}x$$

$$y = C e^{-\int p(x) dx} + e^{-\int p(x) dx} \int e^{\int p(x) dx} q(x) dx$$

$$e^{-\int p(x) dx} = \sqrt{x}$$

$$\int p(x) dx = -\int \frac{dx}{2x} = -\frac{1}{2} \int x^{-1} dx = -\frac{1}{2} \log(x)$$

$$e^{\int p(x) dx} = e^{-\frac{1}{2} \log(x)}$$

$$= e^{\log(x^{-\frac{1}{2}})}$$

$$= x^{-\frac{1}{2}} \Rightarrow \frac{1}{\sqrt{x}}$$

$$y = C \sqrt{x} + \sqrt{x} \int \frac{1}{\sqrt{x}} \cdot \frac{3}{2}x dx$$

$$y = (\sqrt{x} + \sqrt{x}) \left[\frac{3}{2} \int x^{\frac{1}{2}} dx \right]$$

$$y = C \sqrt{x} + \frac{3}{2} \sqrt{x} \left(\frac{x^{\frac{3}{2}}}{\frac{3}{2}} \right)$$

$$y = C \sqrt{x} + x^2$$