EDO (1) NL

$$M(x,y) + N(x,y)\frac{dy}{dx} = 0$$

$$M(x,y) = P(x)\,Q(y)$$

$$N(x,y) = R(x)\,S(y)$$

VARIABLES SEPARABLES

SG

$$\boxed{\int \frac{P}{R}\,dx + \int \frac{S}{Q}\,dy = C_1}$$

$$M(x,y) + N(x,y)\frac{dy}{dx} = 0$$

$$M(\lambda x, \lambda y) = \lambda^{m} M(x,y)$$

$$N(\lambda x, \lambda y) = \lambda^{n} N(x,y)$$

$m = n$

COEF. HOM.

$$u(x) = \frac{y(x)}{x} \Rightarrow y(x) = u(x)\cdot x$$

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

$$SG \Rightarrow \int \frac{dx}{x} + \int \frac{du}{T(u)} = C_1 \qquad u = \frac{y}{x}$$

$$SG \Rightarrow F(x,y) = C_1$$

$$M(x,y) + N(x,y)\frac{dy}{dx} = 0$$

$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x} \quad \text{EXACTA.}$$

SG$_1$ $$\int M\,dx + \int\left(N - \frac{\partial}{\partial y}\int M\,dx\right)dy = C_1$$

SG$_2$ $$\int N\,dy + \int\left(M - \frac{\partial}{\partial x}\int N\,dy\right)dx = C_1$$

$$M(x,y) + N(x,y)\frac{dy}{dx} = 0$$

$$\mu(x,y)M(x,y) + \mu(x,y)N(x,y)\frac{dy}{dx} = 0$$

$$\frac{\partial}{\partial y}(\mu M) = \frac{\partial}{\partial x}(\mu N)$$

$$\frac{\partial \mu}{\partial y}M + \mu\frac{\partial M}{\partial y} = \frac{\partial \mu}{\partial x}N + \mu\frac{\partial N}{\partial x}$$

$\mu \Rightarrow \mu(x)$

$$(0) + \mu(x)\frac{\partial M}{\partial y} = \frac{d\mu}{dx}N + \mu(x)\frac{\partial N}{\partial x}$$

$$\frac{d\mu}{dx}N = \mu(x)\frac{\partial M}{\partial y} - \mu(x)\frac{\partial N}{\partial x}$$

$$d\mu\, N = \mu(x)\left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}\right)dx$$

$$\int\frac{d\mu}{\mu} = \int\left(\frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{N}\right)dx$$

$$\mu = \mu(y) \qquad \frac{d\mu}{dy} M + \mu \frac{\partial M}{\partial y} = (0) + \mu \frac{\partial N}{\partial x}$$

$$\frac{d\mu}{dy} M = \mu \frac{\partial N}{\partial x} - \mu \frac{\partial M}{\partial y}$$

$$d\mu\, M = \mu \left(\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y} \right) dy$$

$$\int \frac{d\mu}{\mu} = \int \left(\frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{M} \right) dy$$

EDO(1) L CV $\begin{cases} H \\ NH. \end{cases}$

$$a_0(x)\frac{dy}{dx}+a_1(x)\,y = Q(x)$$

$$\frac{dy}{dx}+\frac{a_1(x)}{a_0(x)}\,y=\frac{Q(x)}{a_0(x)}.$$

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

Si $q(x)=0$

$$\frac{dy}{dx}+p(x)\,y=0 \qquad \text{EDO(1) L CV } H$$

Si $q(x)\neq 0$

$$\frac{dy}{dx}+p(x)\,y=q(x) \qquad \text{EDO(1) L CV } NH$$

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

SEPARABILE

$$M(x,y) = p(x)\,y \qquad P = p(x) \quad Q = y$$

$$N(x,y) = 1 \qquad R = 1 \quad S = 1$$

$$\int \frac{P}{R}\,dx + \int \frac{S}{Q}\,dy = c_1$$

$$\int p(x)\,dx + \int \frac{dy}{y} = c_1$$

$$\int \frac{dy}{y} = c_1 - \int p(x)\,dx$$

$$\ln y = c_1 - \int p(x)\,dx$$

$$y = e^{\left(c_1 - \int p(x)\,dx\right)}$$

$$y = e^{c_1} e^{-\int p(x)\,dx}$$

$$\boxed{y = c_1 e^{-\int p(x)\,dx}}$$

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

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

$$\frac{d}{dx}\left(y e^{\int p(x)\,dx}\right) = C_1$$

$$\left(y e^{\int p(x)\,dx} \cdot p(x) + e^{\int p(x)\,dx} \frac{dy}{dx} = 0\right.$$

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

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

EDOL(1) CV NH

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

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

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

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

$$y e^{\int p(x)dx} = \int e^{\int p(x)dx} q(x)dx + c_1$$

SG $\quad y = c_1 e^{-\int p(x)dx} + e^{-\int p(x)dx}\int e^{\int p(x)dx} q(x)dx$

EDO(1) L CV NH

$$y_H = c_1 e^{-\int p(x)dx}$$

$$y_{NH} = y_H + y_{p/q}$$

$$\frac{dy}{dx} = \frac{1}{x\cos(y) + \operatorname{sen}(2y)}$$

$$\frac{dx}{dy} = x\cos(y) + \operatorname{sen}(2y)$$

$$\frac{dx}{dy} - x\cos(y) = \operatorname{sen}(2y)$$

$$x(y)$$

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