

$$\text{inhom } \frac{dy}{dx} x^q + y^x p = x^r \Rightarrow x\eta = x\eta \int \frac{t^r}{t^{\eta} t^q} = x\eta + C x^{\eta}$$

$$x\eta = x^2 \begin{cases} \underline{y} - 2y/x = x^2 e^x \\ \underline{y} - 2y/x = 3 \\ \underline{y} - 2y/x = x^2 \cos 3x \\ x^2 \underline{y} - 2xy = 1/x \end{cases} \quad x\eta = -\frac{1}{4x^2} + C x^2 \underset{y(1)=2}{\Rightarrow} C = 5$$

$$x\eta = \frac{1}{x} \begin{cases} x\underline{y} + y + 4 = 0 & x\eta = C/x - 4 \\ x\underline{y} + y = x^{\mathfrak{s}} & x\eta = C/x - x^{\mathfrak{c}}/x \end{cases}$$

$$x\eta = x^{-2} \begin{cases} x\underline{y} + 2y = e^{x^2} & x\eta = x^{-2} (e^{x^2}/2 + C) \\ x^2 \underline{y} + 2xy - x + 1 = 0 & x\eta = 1/2 - 1/x + \frac{C}{x^2 y(1)=0} \Rightarrow C = \frac{1}{2} \end{cases}$$

$$y = e^{Mx} (Ax^2 + Bx + C) \Rightarrow \underline{y} - My = e^{Mx} (2Ax + B + C - CM)$$

$$\underline{y} + 2y = x e^{-2x} / \underline{y} \quad (2) = 0: \quad y = e^{-2x} \left( \frac{x^2}{2} - 1 \right)$$

$$\begin{cases} \underline{y} - 3y = 1 + e^{2x} & y(0) = 0 \text{ AWP} \\ -x^2 \underline{y} + \frac{\cos x}{x} = 3xy & \text{allg Loesung} \end{cases}$$

$$x \underline{y} = x + y \Rightarrow x\eta = x \Rightarrow x\eta = x (\sqrt{x} + C)$$

$$\underline{y} - (1 + 3/x)y = x + 2 \underset{y(1)=e-1}{\Rightarrow}$$

$$\underline{y} - y = e^{2x} \Rightarrow x\eta = e^x \Rightarrow x\eta = e^{2x} + C e^x$$

$$\underline{y} - 3y = e^{2x} + 1 \Rightarrow x\eta = e^{3x} \Rightarrow x\eta = -e^{2x} - \frac{1}{3} + C e^{3x} \underset{y(0)=0}{\Rightarrow} C = \frac{4}{3}$$

$$dy + (2xy - x e^{-x^2}) dx = 0 \Rightarrow x\eta = e^{-x^2} \Rightarrow x\eta = e^{-x^2} (x^2/2 + C)$$

$$\underline{y} + 2y = x e^{-2x} \Rightarrow \underline{y} = e^{-2x} \Rightarrow y = e^{-2x} (x^2/2 + C) \underset{y(2)=0}{\Rightarrow} C = -1$$

$$\underline{y} - 2y = x^2 e^{2x} \Rightarrow \underline{y} = e^{2x} \underset{y(0)=3}{\Rightarrow} y = e^{2x} (x^3/3 + 3)$$

$$-x^2 \underline{y} + \frac{x}{x} = 3xy$$

$$x^2 \underline{y} + 3xy = \frac{x}{x}$$

$$\underline{y} + 2xy = x$$

$$(x + 4) \underline{y} + 3y = 3$$