

$$319) \left(\frac{y^2}{2} + 2ye^x\right)dx + (y + e^x)dy = 0$$

$$f_y = y + 2e^x$$

$$g_x = e^x$$

$$m_y \cdot f + m \cdot f_y = m_x \cdot g + m \cdot g_x$$

$$m = m(x)$$

$$\frac{m(x)}{m} = \frac{f_y - g_x}{g} = \frac{y + 2e^x - e^x}{y + e^x} = \frac{y + e^x}{y + e^x} = 1$$

$$\frac{d}{dx} m = m \quad \text{wird nur von } e\text{-Funktion erfüllt}$$

$$\Rightarrow m = e^x$$

$$e^{\int dx} = e^x$$

$$\frac{m_x}{m} = 1$$

$$\int \frac{m_x}{m} = \int 1$$

$$u(w) = x + \tilde{c} \quad \rightarrow m = e^x + c \quad \text{auf 0}$$

$$\left(\frac{y^2}{2} + 2ye^x\right)e^x dx + (y + e^x)e^x dy = 0$$

$$\left(\frac{y^2}{2}e^x + 2ye^{2x}\right)dx + (ye^x + e^{2x})dy$$

Überprüfung:

$$\left. \begin{array}{l} f_{m_y} = ye^x + 2e^x \\ g_{m_x} = ye^x + 2e^x \end{array} \right\} \text{ gleich } \Rightarrow \text{Integra ... erfüllt} \Rightarrow \text{Gradientenfeld}$$

$$u = \int f_m dx = \int \left(\frac{y^2}{2}e^x + 2ye^{2x}\right) dx = \frac{y^2}{2} \cdot 1 \cdot e^x + \frac{2}{2} ye^{2x} + C(y)$$

$$\frac{y^2}{2}e^x + ye^{2x} + C(y)$$

$$\left. \begin{array}{l} u_y = ye^x + e^{2x} + C'(y) \\ g_m = ye^x + e^{2x} \end{array} \right\} \Rightarrow \begin{array}{l} C'(y) = 0 \\ C(y) = D, \in \mathbb{R} \end{array} \quad \text{konstante}$$

$$u(x, y) = \frac{y^2}{2}e^x + ye^{2x} + \underline{D}$$

$$ye^x \left(\frac{y}{2} + e^x\right) = \tilde{c} \quad c \in \mathbb{R}$$

er noch nach y umformen