

$$\text{Aufg: } y'' - \frac{2}{x+1} y' = 7$$

$$\text{oder } (x+1) y'' - 2 y' = 7(x+1)$$

(a) DGL

$$(b) \text{ W.P.: } y'(0) = 2, \quad y(0) = \frac{1}{2}$$

Lsg: (a) Sei $z := y'$

$$z' - \frac{2}{x+1} z = 7 \quad \Rightarrow \quad A(x) = -2 \int \frac{1}{x+1} dx = \ln(x+1)^{-2}$$

$$\Rightarrow \quad e^{A(x)} = \frac{1}{(x+1)^2} \quad e^{-A(x)} = (x+1)^2$$

$$\Rightarrow y'(x) = z(x) = \left(\int 7 \cdot (x+1)^{-2} dx + C \right) (x+1)^2$$

$$= \left(-7 \cdot (x+1)^{-1} + C \right) \cdot (x+1)^2 \quad - \text{ allg. Lsg f. } y'$$

$$= -7 \cdot (x+1) + C(x+1)^2$$

$$\Rightarrow y(x) = \int (-7(x+1) + C(x+1)^2) dx$$

$$= -\frac{7}{2}(x+1)^2 + \frac{C}{3}(x+1)^3 + D \quad \text{allg. Lsg.}$$

$$(b) 2 = y'(0) = -7 + C \Leftrightarrow C = 9$$

$$\frac{1}{2} y(0) = -\frac{7}{2} + 3 + D = -\frac{1}{2} + D \Leftrightarrow D = 1$$

$$\Rightarrow y(x) = -\frac{7}{2}(x+1)^2 + 3(x+1)^3 + 1 \quad \text{part. Lsg f. (b)}$$