

ARK 7

$$10 = A(10+v) + B(10-v)$$

$$v = -10: 10 = B \cdot 20$$

$$B = 0,5$$

$$v = 10: 10 = A \cdot 20$$

$$A = 0,5$$

$$\int \frac{10}{100-v^2} dv = \int 1 dt$$

$$\int \left(\frac{0,5}{10-v} + \frac{0,5}{10+v} \right) dv = \int 1 dt \quad | \cdot 2$$

$$\int \left(\frac{1}{10-v} + \frac{1}{10+v} \right) dv = \int 2 dt$$

bereslediverit

$$f) \quad \ln|10-v| + \ln|10+v| = 2t + C_1$$

siden $v > 10$:

$$-\ln(v-10) + \ln(10+v) = 2t + C_1$$

$$\ln(10+v) - \ln(v-10) = 2t + C_1$$

$$\ln \frac{(10+v)}{(v-10)} = 2t + C_1$$

$$e^{\ln \frac{(10+v)}{(v-10)}} = e^{2t + C_1}$$

$$\frac{10+v}{v-10} = e^{2t} \cdot e^{C_1} \quad | \cdot (v-10)$$

$$10+v = e^{2t} \cdot C \cdot v - e^{2t} \cdot C \cdot 10$$

$$v - Ce^{2t}v = -10Ce^{2t} - 10$$

$$v(1 - Ce^{2t}) = -10Ce^{2t} - 10 \quad | : (1 - Ce^{2t})$$

$$v = \frac{-10Ce^{2t} - 10}{(1 - Ce^{2t})} \cdot (-1)$$

$$v = \frac{10Ce^{2t} + 10}{Ce^{2t} - 1}$$

$$v(0) = v(5) \text{ fra oppgave b): } v(5) = 50 - 50e^{-0,2 \cdot 5} = 31,6$$

Sette inn

$$31,6 = \frac{10 \cdot C e^{2 \cdot 5} + 10}{C e^{2 \cdot 5} - 1}$$

$$31,6 = \frac{10C + 10}{(C-1)} \quad | \cdot (C-1)$$

$$3116C - 3116 = 10C + 10$$

$$3116C - 10C = 10 + 3116$$

$$2116C = 4116 \quad | : 2116$$

$$C = 1,946$$

$$v(t) = \frac{10 \cdot 1,946 e^{2t} + 10}{1,946 e^{2t} - 1}$$

$$v(t) = \frac{3,16 e^{2t} + 10}{1,946 e^{2t} - 1}$$