



5. Oktober 2011

Physik für Wirtschaftsingenieure
(Mathematische Grundlagen – Lösung)

- 1.1 a) $\frac{1}{x}$
b) $\frac{3}{x}$
c) $-2ay \sin(ay^2 + c)$
d) $-\frac{3z}{\sqrt{1-3z^2}}$
e) $-ae^{-at}$
- 1.2 a) $(a + b^2)t + c$
b) $\frac{1}{b}e^{bt} + c$
c) $\ln|z| + c$
d) $-\frac{1}{8x^2} + c$
e) $\frac{1}{2}\sin(2y) + c$
f) $\frac{1}{2}t + \frac{1}{4}\sin(2t) + c = \frac{1}{2}t + \frac{1}{2}\sin t \cdot \cos t + c$
- 1.3 a) 0
b) 38
c) 1
d) $\frac{1}{6}(2 - \sqrt{2})$
e) $23f(y)$
- 1.4 a) $|\vec{a}| = \sqrt{2}, \quad |\vec{b}| = \sqrt{10}$
b) $\vec{e}_{\vec{a}} = \frac{1}{\sqrt{2}} \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix} = \begin{pmatrix} 0 \\ 1/\sqrt{2} \\ 1/\sqrt{2} \end{pmatrix}, \quad \vec{e}_{\vec{b}} = \frac{1}{\sqrt{10}} \begin{pmatrix} 0 \\ 1 \\ 3 \end{pmatrix} = \begin{pmatrix} 0 \\ 1/\sqrt{10} \\ 3/\sqrt{10} \end{pmatrix}$
c) $77,08^\circ$

d) 1

e) $\begin{pmatrix} 3 \\ -3 \\ 1 \end{pmatrix}$

1.5 a) $[C_1] = \text{m}; [C_2] = \text{m/s}$

b) $[C_1] = \text{m/s}^2$

c) $[C_1] = \text{m/s}^2$

d) $[C_1] = \text{m}; [C_2] = 1/\text{s}$

e) $[C_1] = \text{m/s}; [C_2] = 1/\text{s}$

1.6

$$v_{\text{Kutter}} = 17,5 \text{ km/h}$$

$$v_{\text{Fluss}} = 7,5 \text{ km/h}$$